REPORT RESUMES

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PLANNING SCHOOLS FOR NEW MEDIA.

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THIS MANUAL WAS PREPARED AS A REFERENCE GUIDE TO ASSIST SCHOOL BOARD MEMBERS, SCHOOL SUPERINTENDENTS, AND ARCHITECTS IN PLANNING SCHOOL BUILDINGS SO THAT TEACHERS COULD MAKE FULL AND EFFECTIVE USE OF MODERN MEDIA IN INSTRUCTION. ELEMENTS OF THE MANUAL, AS LISTED IN THE TABLE OF CONTENTS, ARE "THE PLANNING PROCESS," "INSTRUCTIONAL MATERIALS CENTERS," "CLASSROOMS," "LANGUAGE LABORATORIES," "AUDITORIUMS AND MULTIPURPOSE ROOMS," "INTERCOMMUNICATIONS SYSTEMS," "RADIO FACILITIES," "TELEVISION FACILITIES," AND "TOMORROW" (FUTURE APPLICATIONS.) (JH)

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PLANNING SCHOOLS FOR NEW MEDIA

A GUIDE FOR BOARDS OF EDUCATION, SCHOOL ADMINISTRATORS, AND ARCHITECTS

U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE

OFFICE OF EDUCATION

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OE-21021

PLANNING SCHOOLS FOR NEW MEDIA

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OFFICE OF EDUCATION

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This guide has been prepared to assist school board members, school superintendents, and architects in planning school buildings so that teachers may make full and effective use of modern media of instruction.

The need for this manual is found in the ever-increasing use of films and other projected matter, radio and television, electronic learning laboratories, closed-circuit television, intercommunication systems, reading accelerators, and other instructional media. The nation's new school buildings, many of which will serve for 50 years or more, should be designed for proper use of new media or at least fitted so that such media may be used in the future as their instructional values become confirmed.

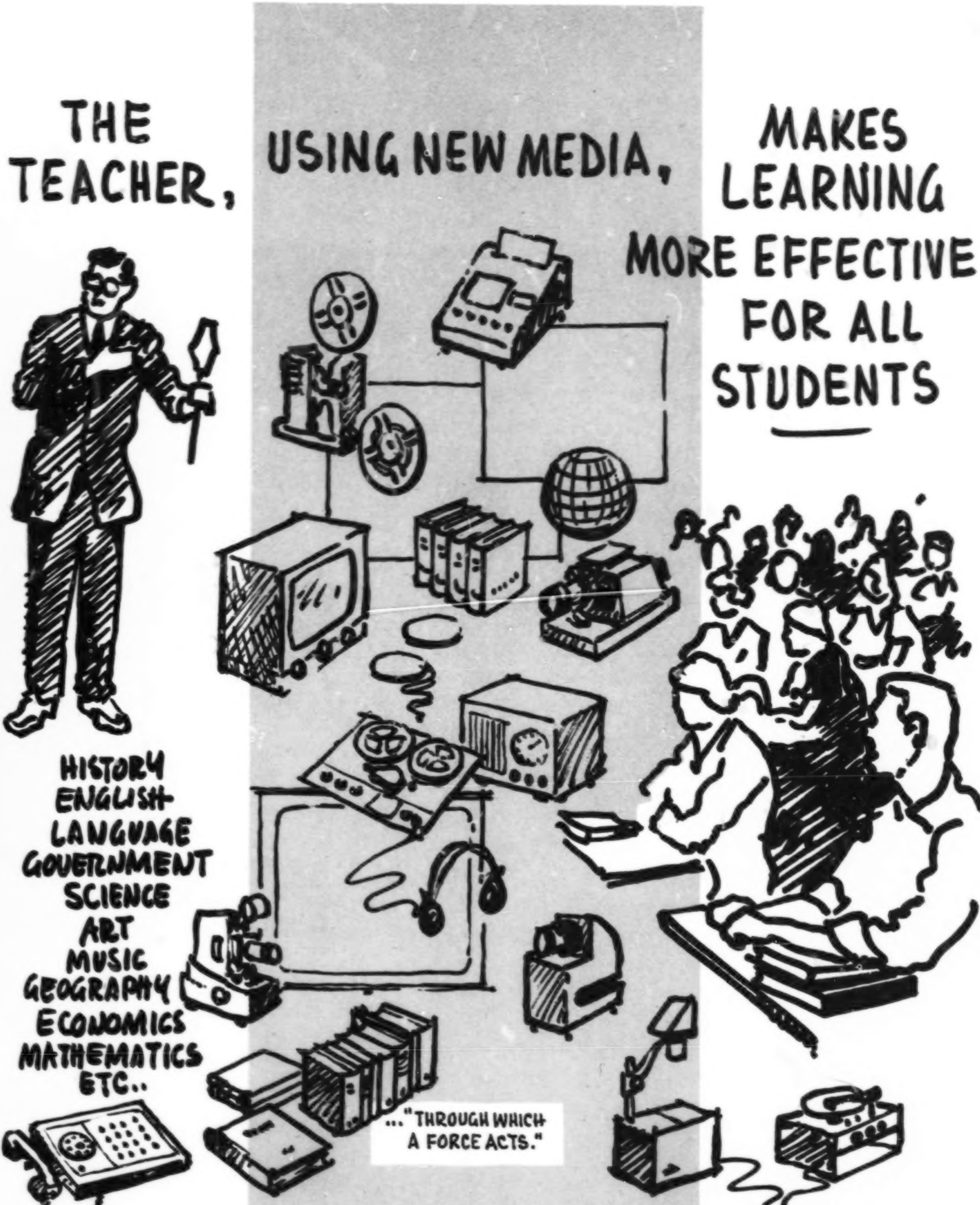
This manual was prepared as a reference guide for an aspect of school planning that has been seriously neglected not only in older school buildings but in many modern ones as well. In bold outline it presents essential information needed by laymen, school people, and architects for planning schools to utilize modern teaching technology.

The guide has been developed in cooperation with the Media Branch of the United States Office of Education as one of a series of contract projects commissioned under provisions of Title 7, Part B, of the National Defense Education Act of 1958.

NEW MEDIA =
NEW TOOLS OF EDUCATION

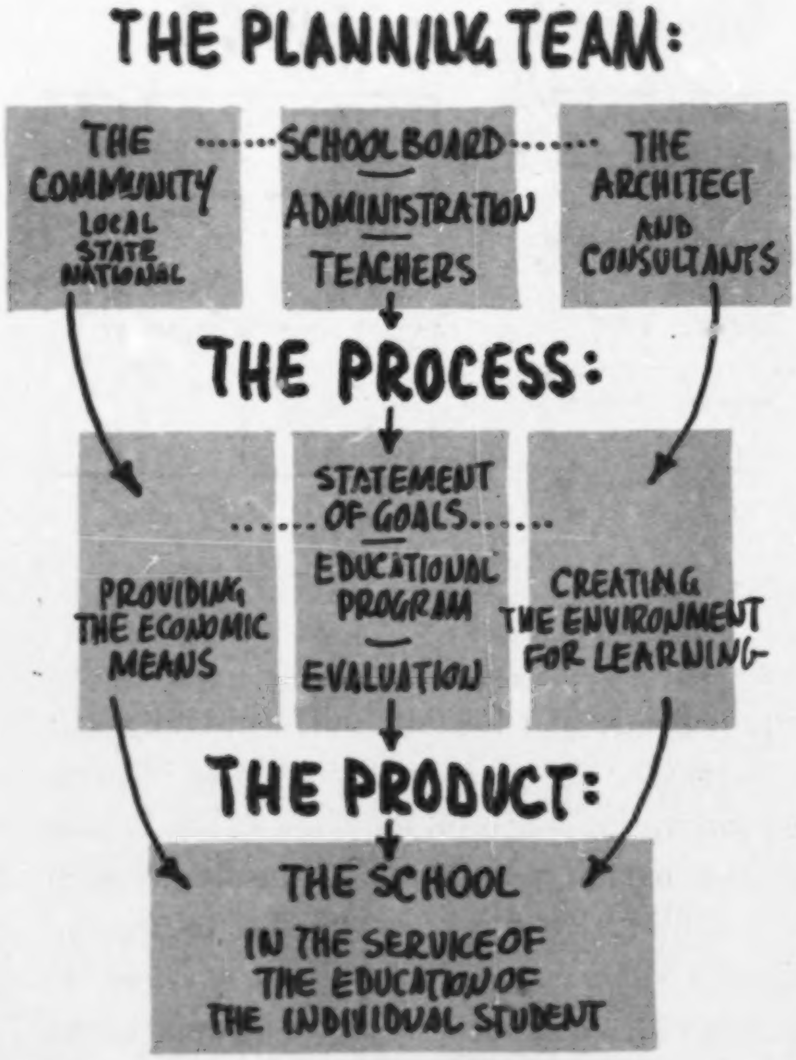
AIDS IN THE EDUCATION OF THE INDIVIDUAL

INTERCOM — P.A. SYSTEMS
TALK → TELEPHONE → **LISTEN**
RADIO
RECORDER - RECORD-TAPE
LANGUAGE LAB
BOOKS - PERIODICALS
CHALKBOARD - PAPER
WRITE → TYPEWRITERS - DUPLICATORS → **READ**
MOVIE PROJECTOR - FILM
FILMSTRIP - PROJECTOR
TEACHING MACHINE
TELEVISION - VIDEOTAPE
SHOW → OPAQUE & OVERHEAD PROJECTOR → **LOOK**
MICROFILM - MICROPROJECTOR
COLOR TRANSPARENCY SLIDE
CAMERA - PHOTOGRAPH
MAKE → MAPS - GLOBES - CHARTS → **USE**
PAINTINGS - DRAWINGS
SCULPTURE - MODELS
LABORATORY EQUIPMENT
CONSTR. MATERIALS
HANDLE → TOOLS → **STORE**


THE TEACHER,
USING NEW MEDIA,
MAKES LEARNING MORE EFFECTIVE FOR ALL STUDENTS
HISTORY
ENGLISH
LANGUAGE
GOVERNMENT
SCIENCE
ART
MUSIC
GEOGRAPHY
ECONOMICS
MATHEMATICS
ETC..
..."THROUGH WHICH A FORCE ACTS."

STRUCTURAL

THE PLANNING PROCESS


THE PLANNING TEAM:
THE COMMUNITY
LOCAL
STATE
NATIONAL
SCHOOL BOARD
ADMINISTRATION
TEACHERS
THE ARCHITECT AND CONSULTANTS
THE PROCESS:
STATEMENT OF GOALS
EDUCATIONAL PROGRAM
EVALUATION
PROVIDING THE ECONOMIC MEANS
CREATING THE ENVIRONMENT FOR LEARNING
THE PRODUCT:
THE SCHOOL
IN THE SERVICE OF THE EDUCATION OF THE INDIVIDUAL STUDENT

Although the content of this manual concerns the planning of school buildings for use of modern tools of teaching, the approach to planning is in itself of sufficient importance to warrant special comment. Principles of good planning apply to all aspects of school building construction, not alone to planning for new educational media. Nonetheless, it is appropriate here to review certain guidelines of the planning process, even though they may have broader application than to the specific areas of planning covered in this manual.

Planning should be based on soundly conceived educational uses of the media to be employed.

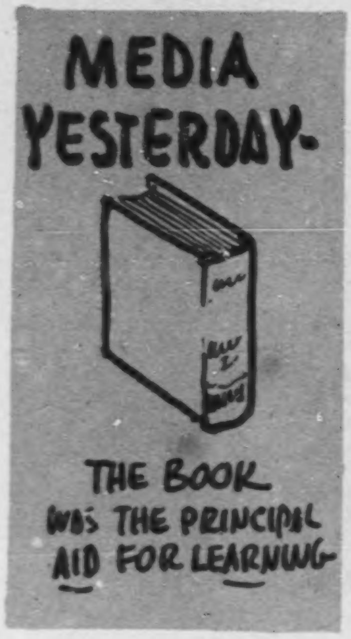
It is impossible to over-state the need for a critical examination of new educational media in relation to accepted principles of teaching. Use of these media should contribute to educational goals that are accepted and clearly understood by the school board, administrators, and teachers.

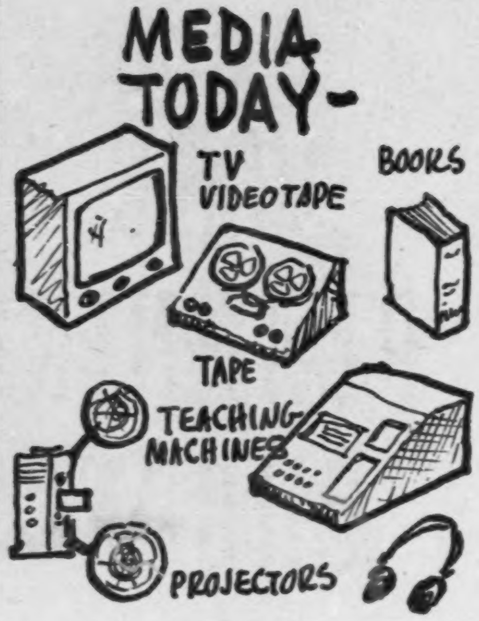
The instructional values of new educational media will depend largely on the ability of local personnel to use them effectively. Since this ability will differ with the staffs and other resources of school systems, the determination of instructional values will take place in a different context in each school district.

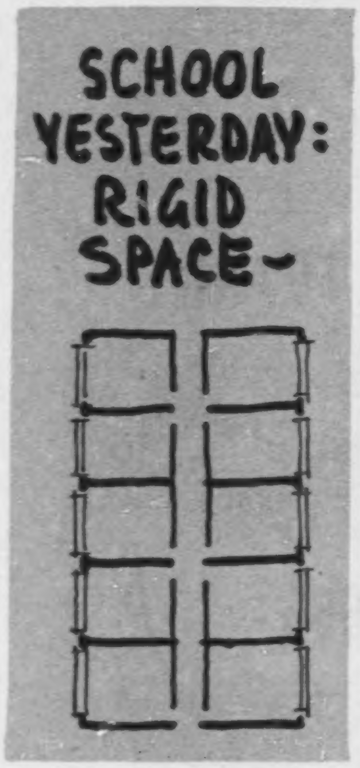
Planning for new educational media should provide for change.

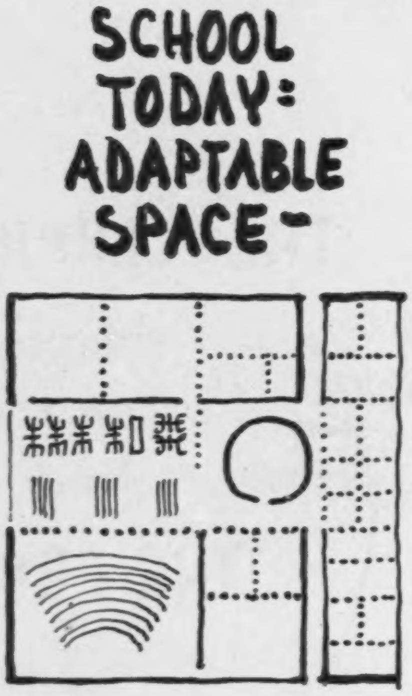
The rate of change in this country's scientific and technological achievements has turned yesterday's flight of imagination into today's reality. Even though ability to adapt inventions to useful and productive ends often lags behind mechanical inventiveness, the present rate of technological progress virtually assures that the mechanical aids now being used in the schools will be greatly different twenty years from now.

Judging from the rate of growth in new educational media and their assimilation into the processes of education, building planning will be influenced increasingly by these media in the years ahead. The public schools are facing fundamental revisions of traditional methods of instruction, revisions that will certainly affect school building construction. Thus provisions for flexibility, expansibility, and ease of alteration should extend through all phases of school building planning, including those aspects of planning relating to use of new educational media.


MEDIA
YESTERDAY-
THE BOOK
WAS THE PRINCIPAL
AID FOR LEARNING-

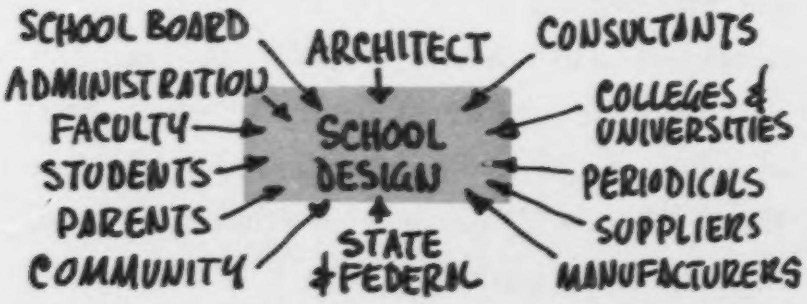

MEDIA
TODAY-
TV
VIDEOTAPE
BOOKS
TAPE
TEACHING
MACHINES
PROJECTORS


SCHOOL
YESTERDAY:
RIGID
SPACE-


SCHOOL
TODAY:
ADAPTABLE
SPACE-

Use many sources of information in planning.

In addition to the help that should be sought from those in the school system who will be using a new facility, many external sources of information may be sought. The chief single source of such help will be the architect, where one is employed. His knowledge of specialists in such areas as acoustics, light control, other special electrical requirements, and heating and ventilating will ordinarily be the greatest single source of help. Beyond this, it is helpful to review discussions in professional journals, to employ consultants when the architect's resources are limited, to write to school systems using a medium in question, to consult with a number of agents of manufacturers of specialized equipment, and to make use of the planning resources of state departments of education, colleges, and universities.


SCHOOL BOARD
ADMINISTRATION
FACULTY
STUDENTS
PARENTS
COMMUNITY
ARCHITECT
SCHOOL
DESIGN
STATE
& FEDERAL
CONSULTANTS
COLLEGES &
UNIVERSITIES
PERIODICALS
SUPPLIERS
MANUFACTURERS

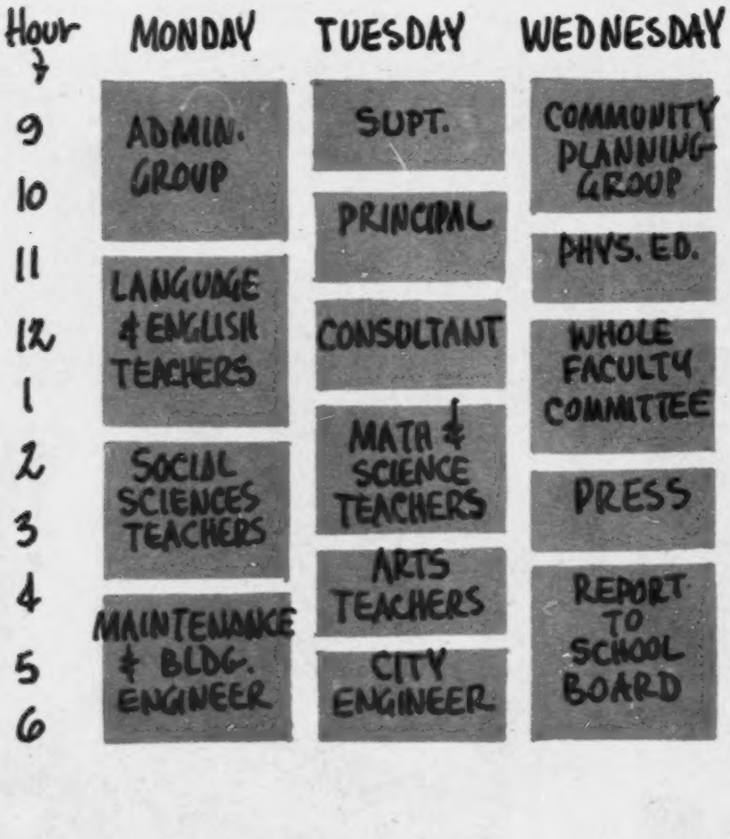
Involve the school staff in planning.

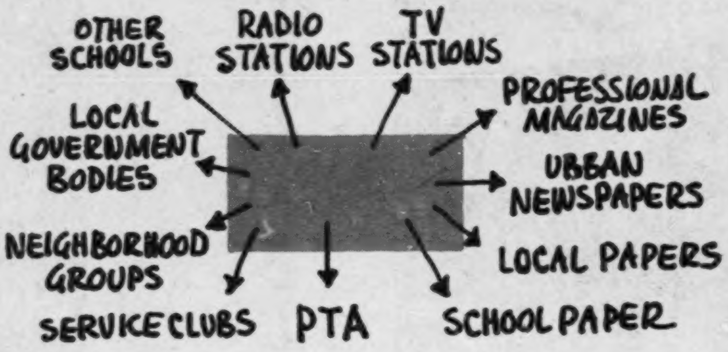
This is axiomatic. In the planning process it is good sense to involve those who will be affected, not only for morale reasons, but to avoid unnecessary and costly errors. Superficial use of personnel to give an illusion of "democratic process" serves no good end; ideas should be sought with purpose and carefully weighed for value. Above all, solicited ideas should be used when their value warrants it, and reasons for rejecting ideas should be discussed to the satisfaction of those who offered them.

The phrase "those who will be affected" should be interpreted broadly. The views of technicians, secretaries, and custodians may often be helpful.

PLAN YOUR TIME AND YOUR STAFF'S TIME
TO EXPLORE-WORK-PLAN WITH YOUR ARCHITECT:

Sample schedule for architect's task force:


Hour
MONDAY
TUESDAY
WEDNESDAY
9
10
11
12
1
2
3
4
5
6
ADMIN. GROUP
LANGUAGE & ENGLISH TEACHERS
SOCIAL SCIENCES TEACHERS
MAINTENANCE & BLDG. ENGINEER
SUPT.
PRINCIPAL
CONSULTANT
MATH & SCIENCE TEACHERS
ARTS TEACHERS
CITY ENGINEER
COMMUNITY PLANNING GROUP
PHYS. ED.
WHOLE FACULTY COMMITTEE
PRESS
REPORT TO SCHOOL BOARD

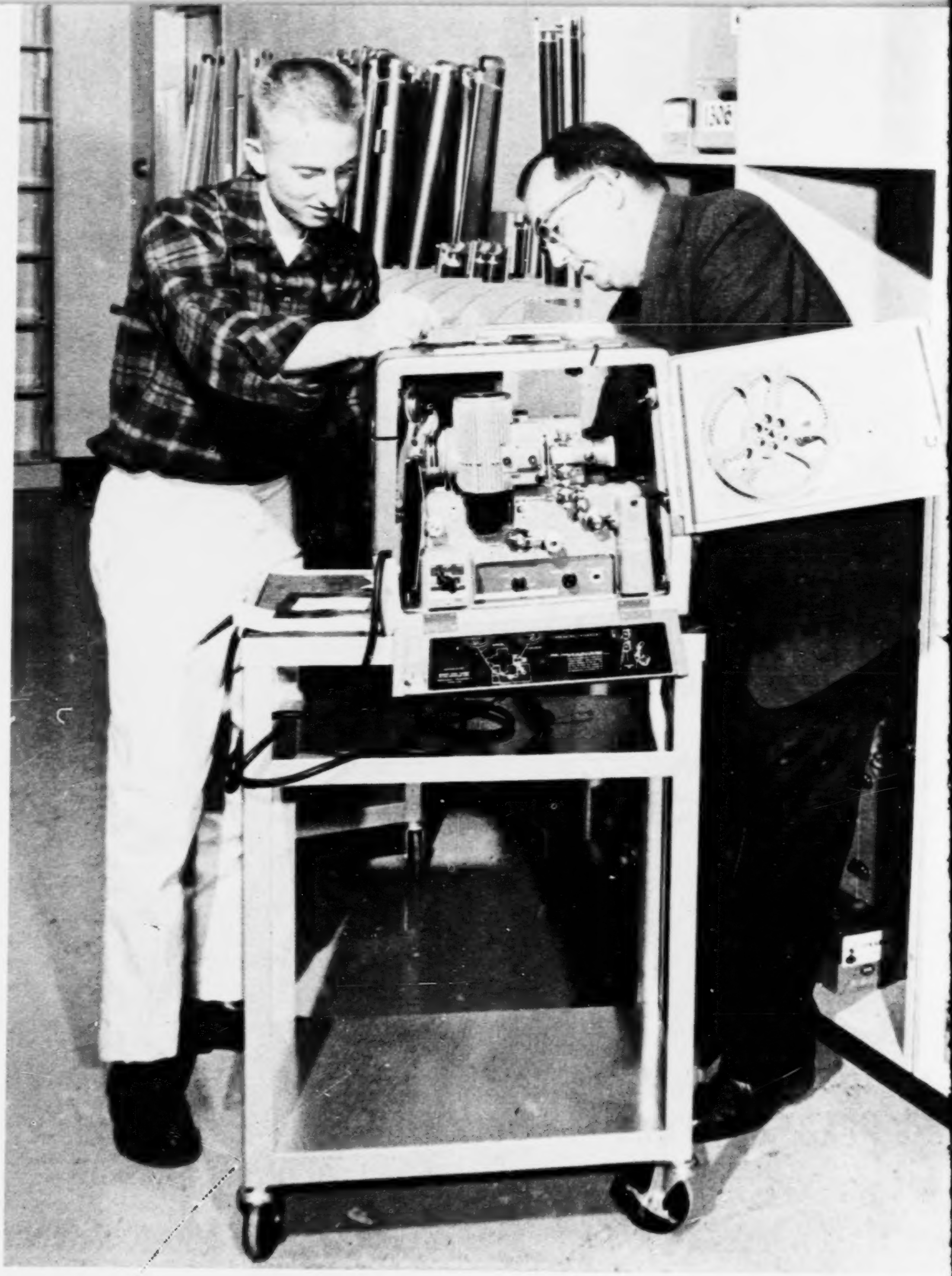

OTHER SCHOOLS
RADIO STATIONS
TV STATIONS
PROFESSIONAL MAGAZINES
LOCAL GOVERNMENT BODIES
URBAN NEWSPAPERS
NEIGHBORHOOD GROUPS
LOCAL PAPERS
SERVICE CLUBS
PTA
SCHOOL PAPER

The public should be informed as planning develops.

Use of new educational media is especially susceptible to public criticism both as regards cost and educational value. For this reason it is well to explain to the public through newspapers, P.T.A.'s, and other forms of communication the reasons for use of such media in the school system. Where large expenditures are involved, it is appropriate to engage community groups in the planning that precedes use of a new medium.

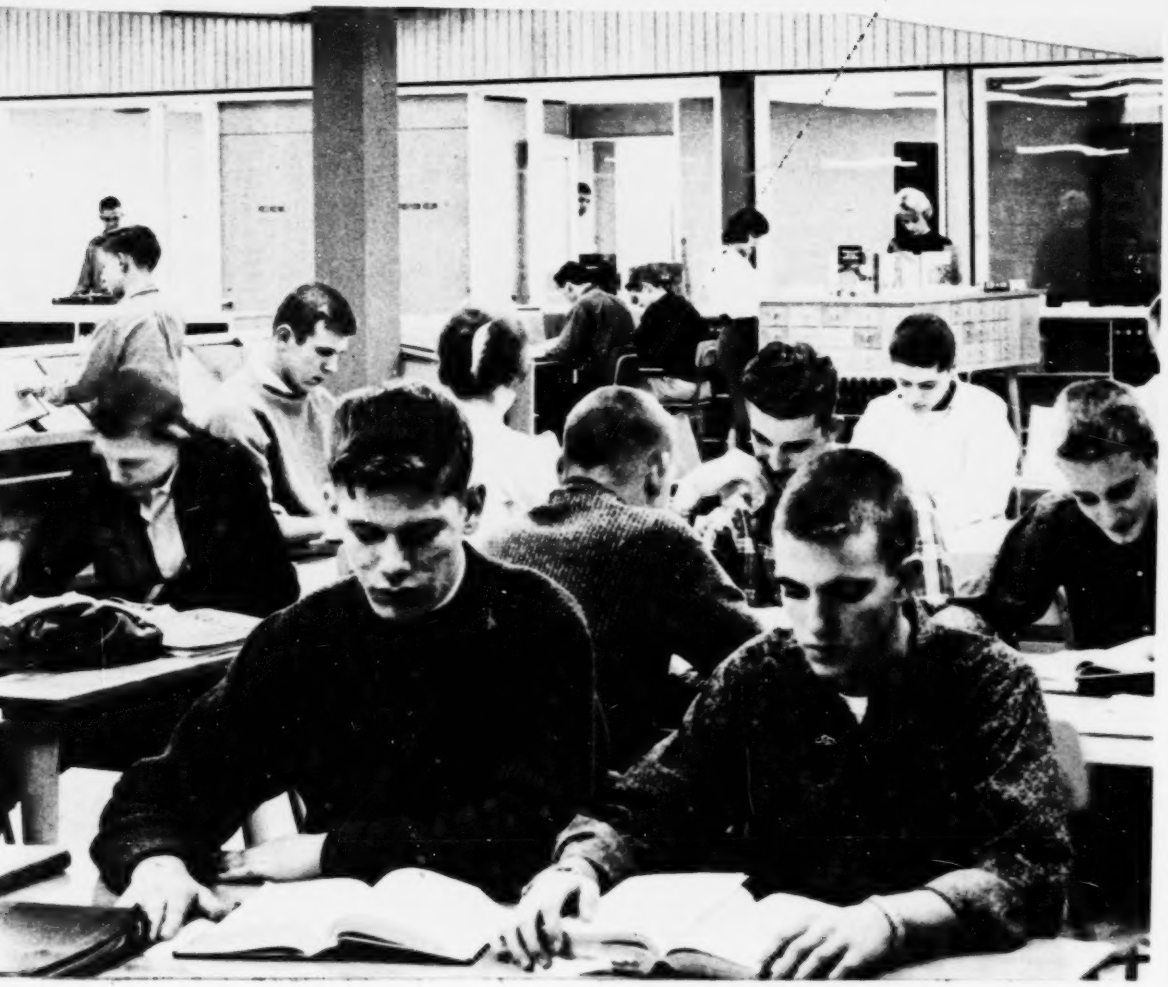
Planning should result in specific instructions for the architect regarding the educational functions of new media to be employed.

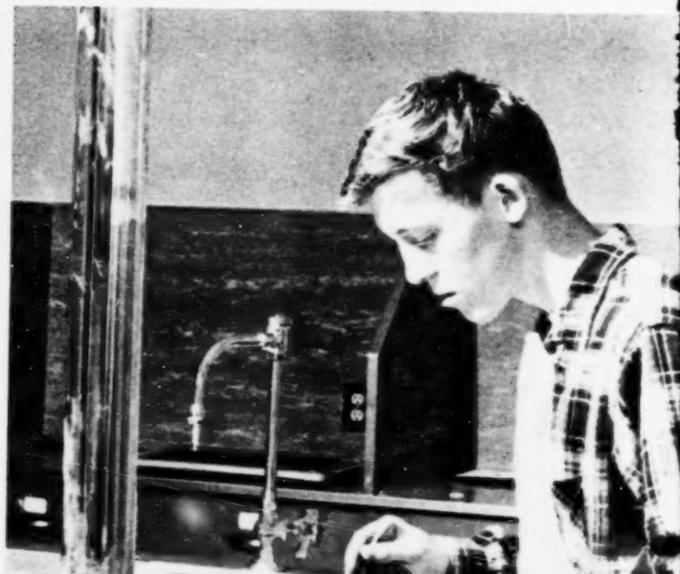
Specific suggestions regarding quality and type of equipment and arrangement of space as they relate to educational functions will be helpful to the architect. The more closely the educational uses of modern media are defined for the architect, the better job he can do in designing space and selecting building materials and equipment. A careful delineation of educational uses of a new facility will also help to clarify its values for boards of education and educators.



LOY NORRIX HIGH SCHOOL, KALAMAZOO, MICHIGAN

▲▼ MARSHALL HIGH SCHOOL, PORTLAND, O





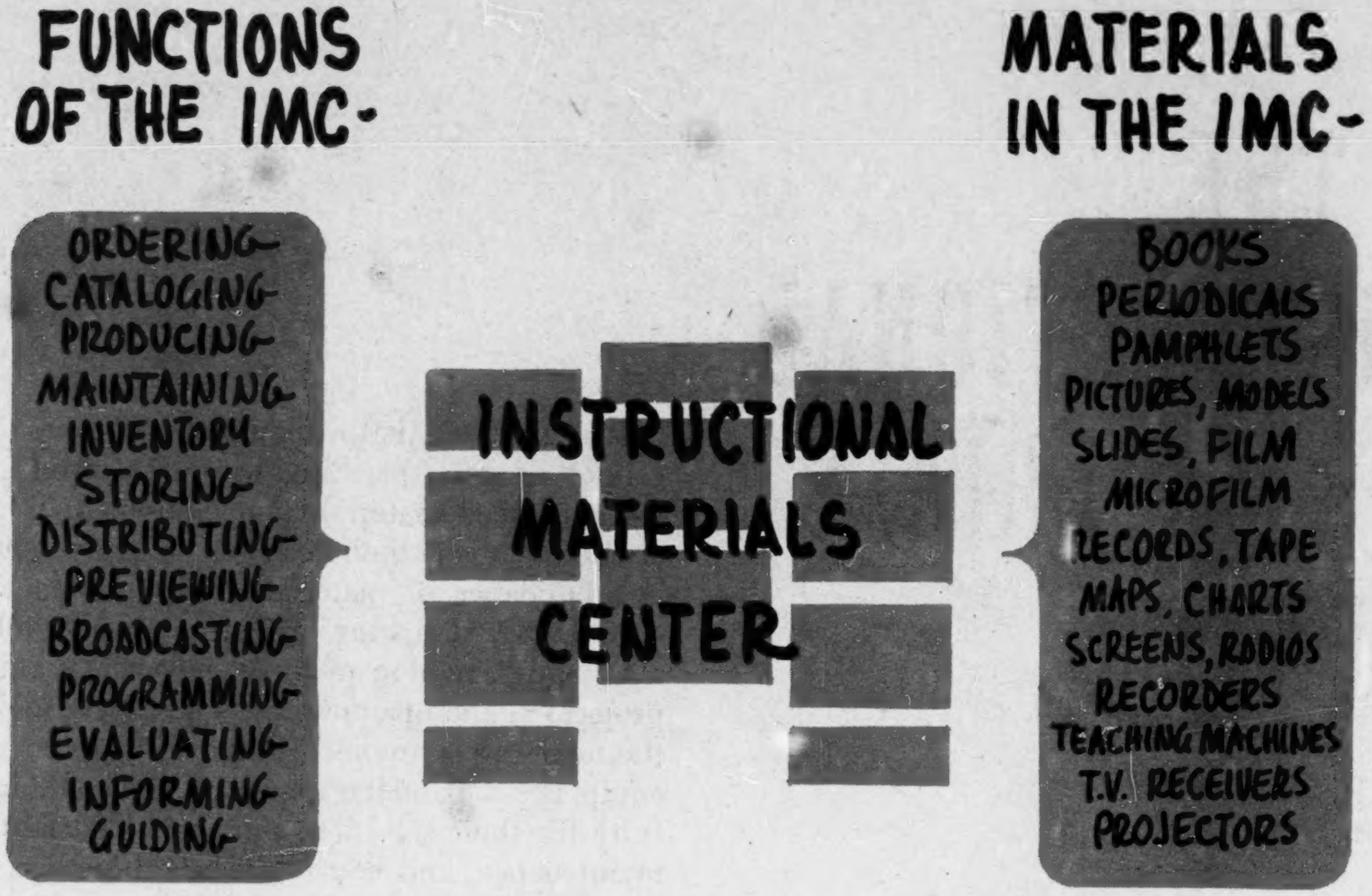
THE INSTRUCTIONAL MATERIALS CENTER

It is often stated that without good teachers there cannot be good teaching. However, even good teachers need materials and equipment if they are to function at their best. Science has produced an abundance of materials and equipment for school use. Teaching machines, radio, television, slides, motion pictures, recordings, microprojectors, and opaque projectors all are tools of the modern classroom. With such materials and equipment at hand it is important to plan thoughtfully for their selection, purchase, distribution, maintenance, and housing. These functions can best be served in most schools by a materials center.

Because the materials center unifies all functions relating to instructional materials, it is also the logical area around which to organize certain learning activities. These may include library reading, browsing, small-group conferences, auditioning of tapes and records, and individual research and study.

The size and number of spaces provided for these activities will depend on the level (high school, junior high, or elementary), the size of the school, and on local philosophy of use. The following criteria and suggestions must therefore be adapted to local conditions by school executives and boards of education.

Criteria for library reading rooms and book storage spaces are omitted from this manual because planning materials already exist for these facilities, and because this manual is concerned only with facilities relating to new instructional media. Nonetheless, this publication assumes that the materials center will embrace all functions normally carried on by school libraries.


FUNCTIONS OF THE IMC-
ORDERING-
CATALOGING-
PRODUCING-
MAINTAINING-
INVENTORY-
STORING-
DISTRIBUTING-
PREVIEWING-
BROADCASTING-
PROGRAMMING-
EVALUATING-
INFORMING-
GUIDING-
INSTRUCTIONAL MATERIALS CENTER
MATERIALS IN THE IMC-
BOOKS
PERIODICALS
PAMPHLETS
PICTURES, MODELS
SLIDES, FILM
MICROFILM
RECORDS, TAPE
MAPS, CHARTS
SCREENS, RADIOS
RECORDERS
TEACHING MACHINES
T.V. RECEIVERS
PROJECTORS

It should be emphasized that the instructional materials center described in this section is a school rather than a school system center. The following general criteria and suggestions should be helpful in planning the center.

The storage, cataloging, inventory, and distribution of books and of all other teaching materials should be combined in one center, designed to assure coordinated, efficient use of its resources.

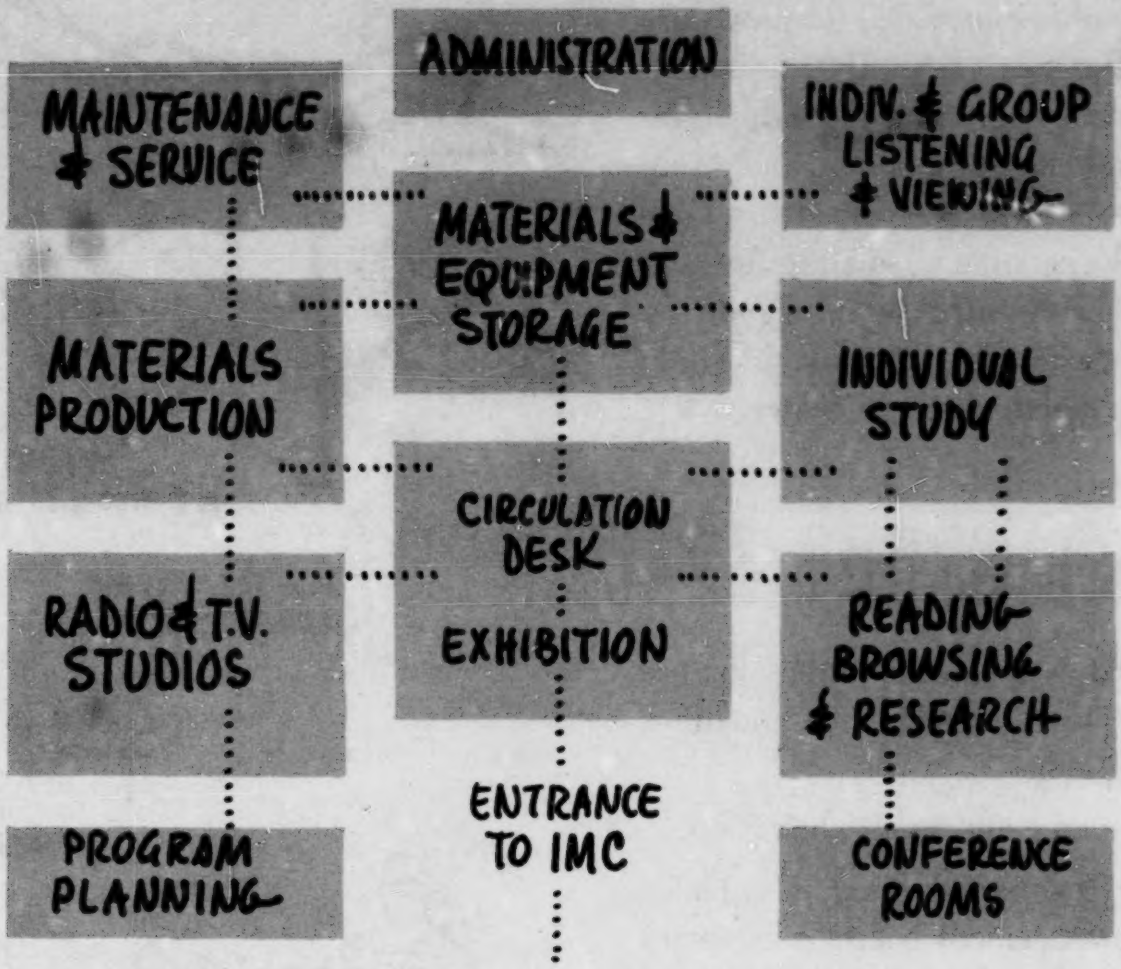
The instructional materials center should be located centrally for the efficient distribution of equipment and materials and for convenient use by teacher and students.

In buildings of more than one floor, elevators or ramps should be provided so that books, materials, and equipment can be transported easily. Floors and entry ways through which carts must pass should be free of obstructions. Kickplates and jamb protection should be provided where equipment must be moved through doors.

Due to the weight of materials and equipment needed in the center, and due to problems of handling and distributing supplies and equipment, a ground floor location is preferable.

All features of the center should be planned for flexible arrangement. Storage, cabinets, shelves, and walls (where acoustical considerations permit) should be designed to be movable so space may be rearranged to meet the changing functions of the center and make possible multiple uses of space.

SPACE RELATIONSHIP DIAGRAM -


ADMINISTRATION
MAINTENANCE & SERVICE
INDIV. & GROUP LISTENING & VIEWING
MATERIALS & EQUIPMENT STORAGE
MATERIALS PRODUCTION
INDIVIDUAL STUDY
CIRCULATION DESK
RADIO & T.V. STUDIOS
EXHIBITION
READING BROWSING & RESEARCH
ENTRANCE TO IMC
PROGRAM PLANNING
CONFERENCE ROOMS

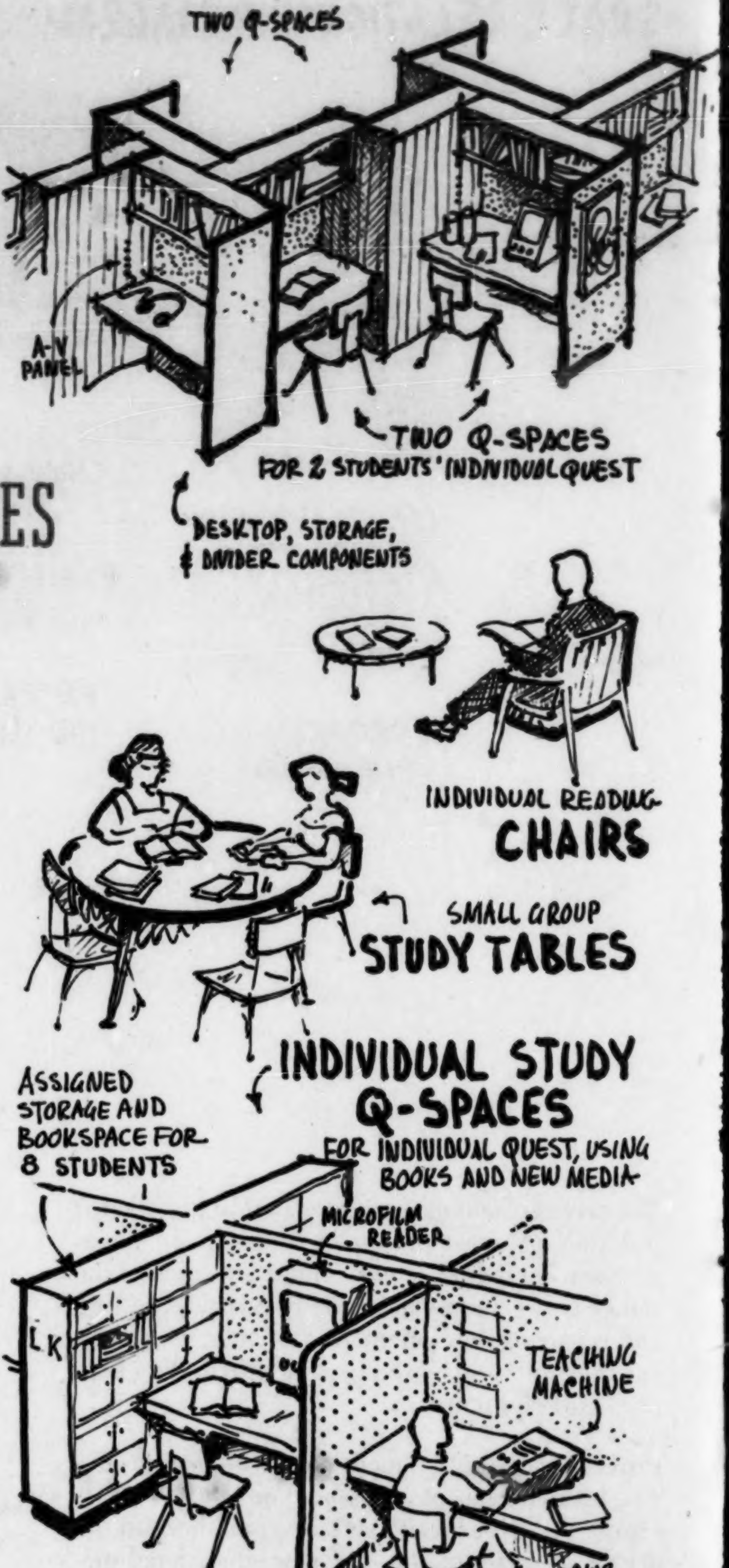
The arrangement of the center should provide for isolation of noise-producing areas from classrooms and reading rooms. Those activities of the center that generate noise are previewing, testing and repairing equipment, auditioning, preparing teaching aids and materials, and distributing supplies and equipment.

Provisions should be made for future expansion. The ultimate size of any school or school district cannot be foreseen with certainty; neither can the degree of increase in use of new educational media. Therefore, the materials center should be planned so it can be expanded with a minimum of cost and disruption to adjoining areas.

Space requirements for storage, distribution, and preparation of materials will depend on the degree to which these functions are shared between the center and the classroom.

Adequacy of storage is paramount. Long-range requirements for storage of equipment and materials must be considered.

Within the instructional materials center, reading and study areas should be provided for group use of library and reference materials, individual and group listening to tapes and recordings, informal reading (browsing), individual and group screening of films, slides, and filmstrips (one facility), and for the conduct of small-group conferences. The following suggestions should be useful in planning the non-library work and study areas of the instructional materials center.


TWO Q-SPACES
A-V PANEL
TWO Q-SPACES FOR 2 STUDENTS' INDIVIDUAL QUEST
DESKTOP, STORAGE, & DIVIDER COMPONENTS
INDIVIDUAL READING CHAIRS
SMALL GROUP STUDY TABLES
INDIVIDUAL STUDY Q-SPACES FOR INDIVIDUAL QUEST, USING BOOKS AND NEW MEDIA
ASSIGNED STORAGE AND BOOKSPACE FOR 8 STUDENTS
MICROFILM READER
TEACHING MACHINE
L K
CWB

INDIVIDUAL STUDY SPACES

Should be equipped with electric outlets for use of listening devices, teaching machines, and other individual teaching aids.

Should have a desk area and small book shelf.

Should have noise resistant flooring in cubicles and aisles. Perforated cement board resistant to abrasion and easily cleaned is a satisfactory lining for cubicles.

Should be properly ventilated.

Should be provided lighting of proper intensity and quality for individual study.

INDIVIDUAL AND GROUP LISTENING STATIONS

Should be soundproof, well ventilated, and designed for convenient visual supervision.

Should be equipped with two double electrical outlets; a shelf to accommodate tape recorder or record player; storage for tape recorder, record player, earphones, and small number of tapes and records; chairs for desired number of listeners; and a jack box (for earphone plug-ins) with desired number of outlets.

SMALL GROUP CONFERENCE AREAS

Should accommodate six to eight students for the purpose of enabling small groups of like interests or purposes to do planning work or to carry on discussions.

Should have space for small conference table and chairs. The table should be equipped with drawers or cubicles for books and notebooks.

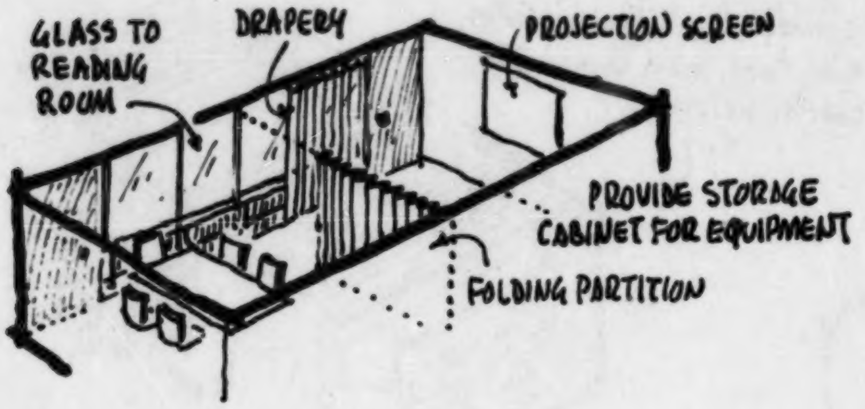
Should be provided all of the basic equipment of a listening station.

Should be located adjacent to the library reading and reference room for convenient access to reference materials.

Should be arranged and designed for convenient visual supervision.

Should be soundproof, with special attention given to ventilation requirements.

Should have folding partition to permit flexible use, where two conference rooms are adjacent. Partition should be selected and installed to provide as much sound protection as possible. Ventilation should be provided in both units.


GLASS TO READING ROOM
DRAPERY
PROJECTION SCREEN
PROVIDE STORAGE CABINET FOR EQUIPMENT
FOLDING PARTITION

FILM PREVIEW SPACE

Should be designed for use by small groups only.

Should be well ventilated, and have independent temperature controls.

Should be soundproof or separated from study or instructional areas.

Should have double electrical outlets or continuous plug-in strip on each wall.

May be equipped with two or more screens and projectors, with earphones provided to enable simultaneous previewing of two or more films.

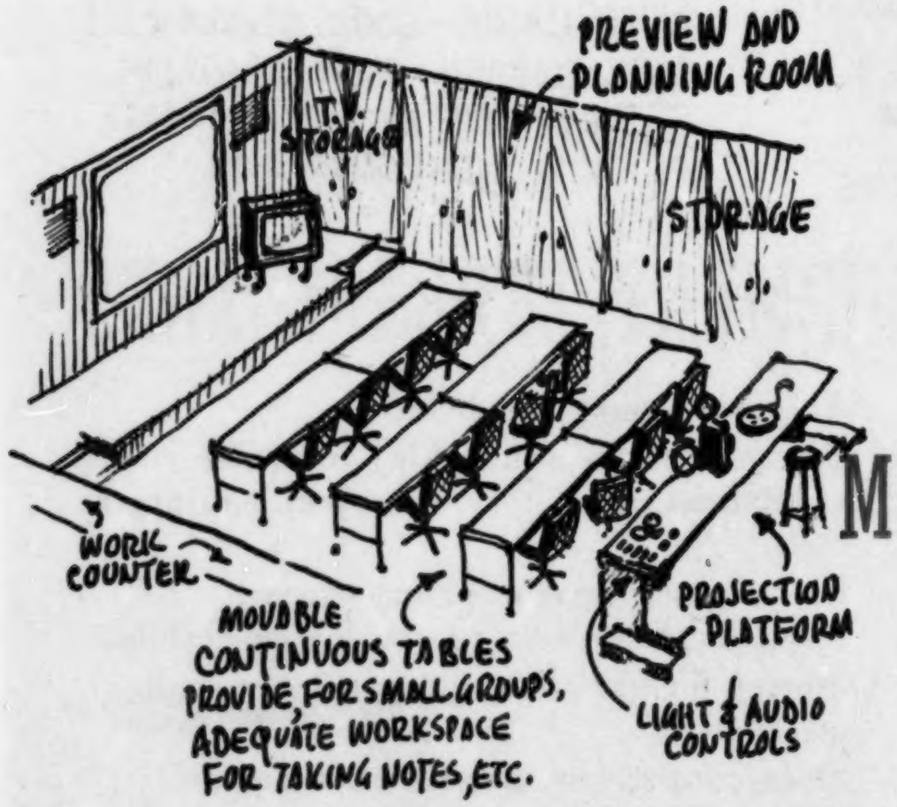
Should have dimmer light control to permit notetaking while films are being shown.

Should have no windows.

Should be located near projection equipment storage area.

Should be acoustically treated to prevent excessive reverberation.

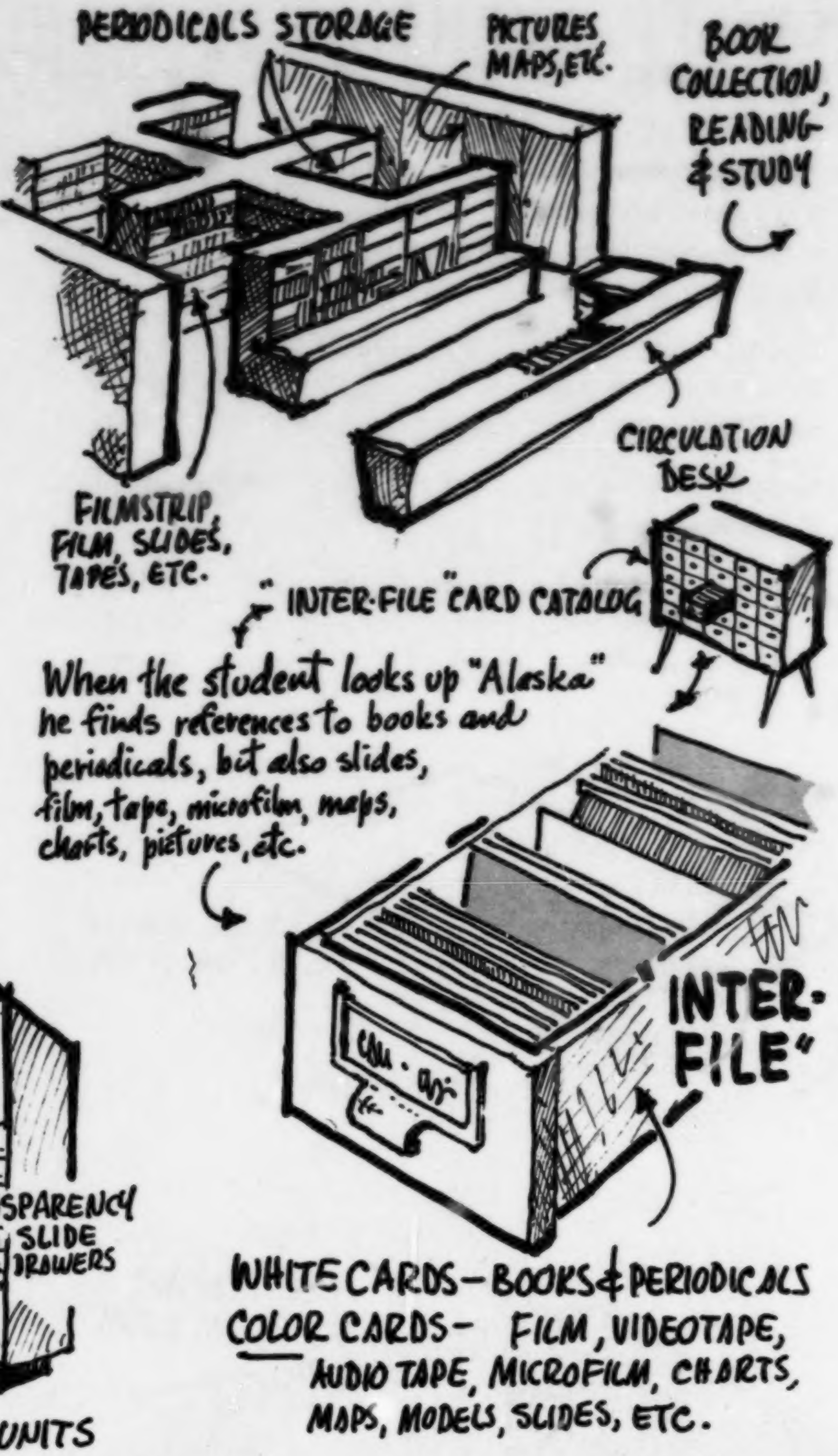
Should have quiet, durable floor (rubber tile or cork is recommended).


PREVIEW AND PLANNING ROOM
T.V. STORAGE
STORAGE
WORK COUNTER
MOVABLE CONTINUOUS TABLES PROVIDE, FOR SMALL GROUPS, ADEQUATE WORKSPACE FOR TAKING NOTES, ETC.
PROJECTION PLATFORM
LIGHT & AUDIO CONTROLS

MICROFILM READER SPACE

Should have space for microfilm readers, desk, and chair. A special room is not needed unless a large number of readers are used.

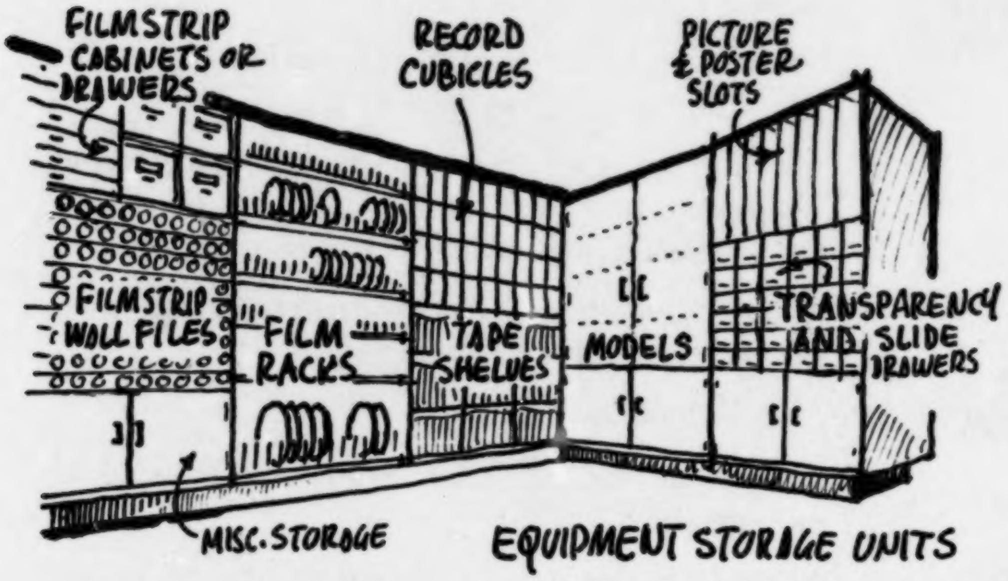
In addition to the work and study areas just described, the following areas and spaces should be provided in the instructional materials center:


PERIODICALS STORAGE
PICTURES MAPS, ETC.
BOOK COLLECTION, READING & STUDY
FILMSTRIP, FILM, SLIDES, TAPES, ETC.
CIRCULATION DESK
"INTER-FILE" CARD CATALOG
When the student looks up "Alaska" he finds references to books and periodicals, but also slides, film, tape, microfilm, maps, charts, pictures, etc.
"INTER-FILE"
WHITE CARDS – BOOKS & PERIODICALS
COLOR CARDS – FILM, VIDEOTAPE, AUDIO TAPE, MICROFILM, CHARTS, MAPS, MODELS, SLIDES, ETC.

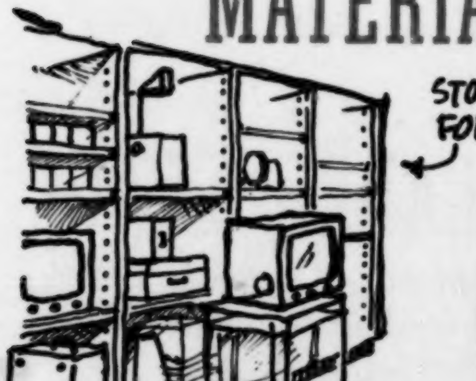
CIRCULATION AREA

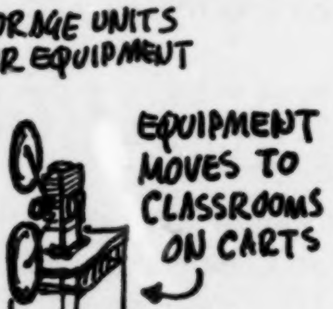
This area should serve the two major circulation functions of the instructional materials center — books and periodicals; teaching materials and equipment. A separate distribution area should be provided for teaching materials and equipment so that noise of equipment handling and delivery will not enter the library.

Space for card catalog, inventory, and circulation files for all books, materials, and equipment should be provided.


FILMSTRIP CABINETS OR DRAWERS
RECORD CUBICLES
PICTURE & POSTER SLOTS
FILMSTRIP WALL FILES
FILM RACKS
TAPE SHELVES
MODELS
TRANSPARENCY AND SLIDE DRAWERS
MISC. STORAGE
EQUIPMENT STORAGE UNITS

MATERIALS AND EQUIPMENT STORAGE AREA


STORAGE UNITS FOR EQUIPMENT


EQUIPMENT MOVES TO CLASSROOMS ON CARTS

This area should provide for:

Storage (partly adjustable) for audio-visual equipment, projectors, recorders, equipment carts.

Racks for storage of maps and screens.

Space for globes, dioramas, models, and exhibits.

Storage for filmstrips, slides, tapes, recordings, and films.

Storage for science demonstration carts.

Storage for pictures and specimens.

MATERIALS PRODUCTION AREA

This area should provide for reproduction of printed materials and for the construction of teaching materials such as recordings, exhibits, charts, slides, posters, models, overhead transparencies, and programmed learning sequences for teaching machines. If a TV studio is included in the center, the production area should also serve its needs. The production center should be equipped with:

Darkroom designed for production and for the instruction of a class of 20 students.

Electrical outlets to carry load of dry mounting press, duplicators, and small power tools.

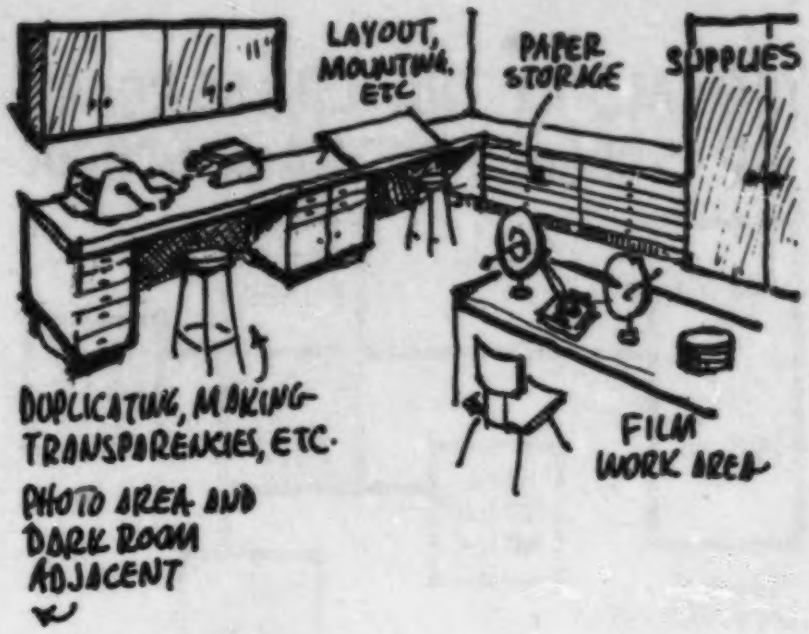
Work counters, layout tables.

Storage space for construction materials (paper, wood, plastic, metal).

Tool cabinets for small hand tools.

Sinks with hot and cold water.

Duplicating facilities (mimeograph, multilith).


LAYOUT, MOUNTING, ETC
PAPER STORAGE
SUPPLIES
DUPLICATING, MAKING TRANSPARENCIES, ETC.
PHOTO AREA AND DARK ROOM ADJACENT
FILM WORK AREA

OFFICE AREA

This area should provide space for a supervisor, a place for correspondence, conferences, and typing. If space is planned in the building for a person in charge of curriculum, consideration should be given to including an office for this person in the center. This area should be located near the circulation area and should be equipped with:

Space for desk, typing table, and conference table.

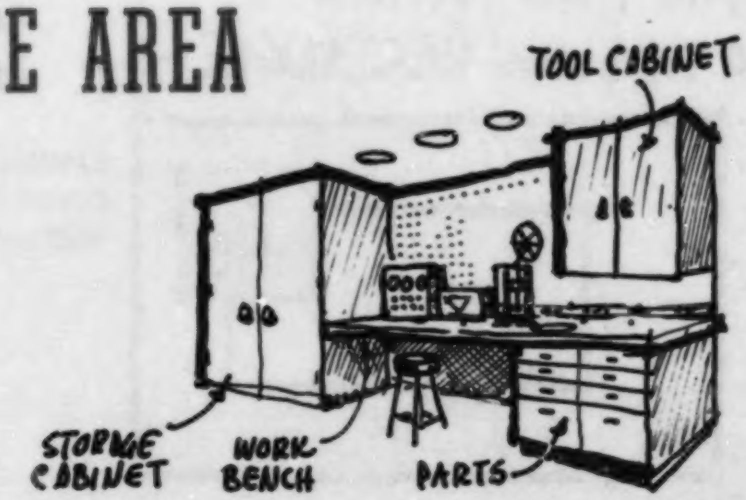
Shelves for books.

Storage cabinets.

Space for correspondence files.

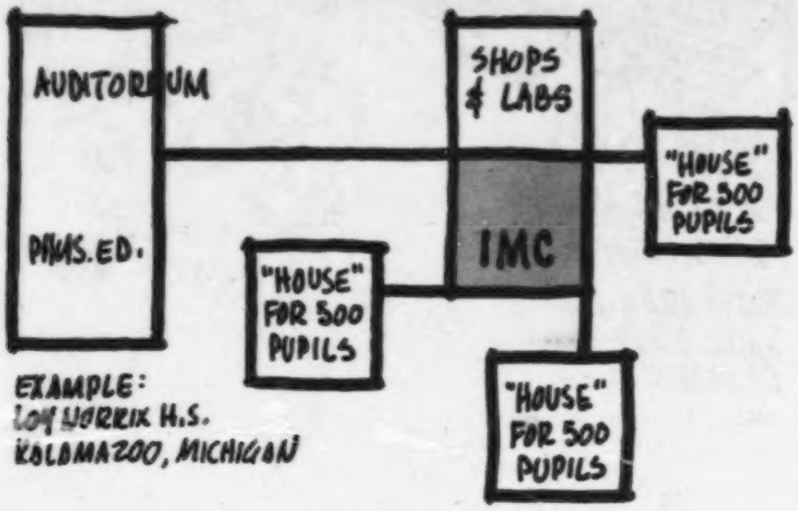
MAINTENANCE AND SERVICE AREA

This area should be designed to house:
Work bench with outlets.
Storage cabinets for parts.
Storage for standby equipment.
Tool panel.
Storage for equipment and materials needing repair.


TOOL CABINET
STORAGE CABINET
WORK BENCH
PARTS

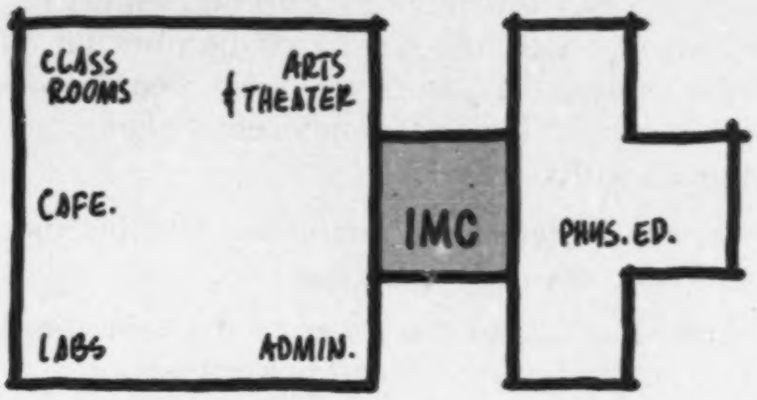
IMC AS THE HUB OF THE SCHOOL

THE IMC AT THE CROSSROADS OF SCHOOLS-WITHIN-A-SCHOOL


AUDITORIUM
PHYS. ED.
SHOPS & LABS
IMC
"HOUSE" FOR 500 PUPILS
"HOUSE" FOR 500 PUPILS
"HOUSE" FOR 500 PUPILS

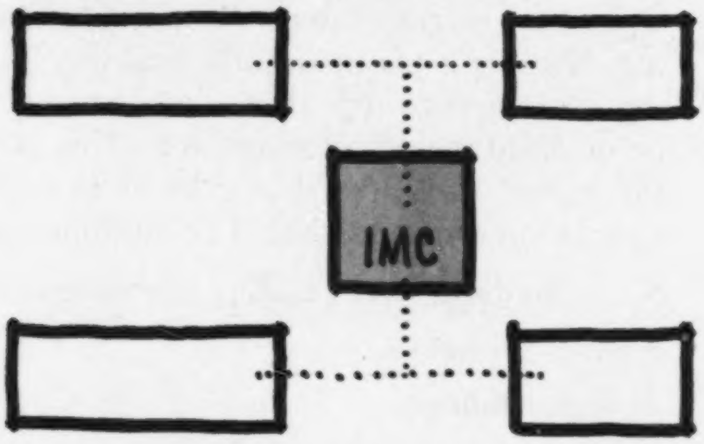
EXAMPLE:
LOY NORRIX H.S.
KALAMAZOO, MICHIGAN

THE IMC AS THE CENTER OF A COMPACT HIGH SCHOOL-

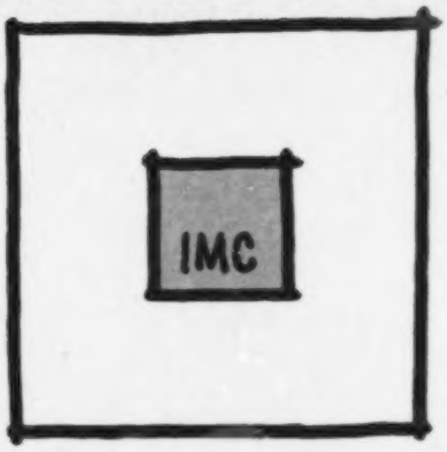

CLASS ROOMS
ARTS & THEATER
CAFE.
IMC
PHYS. ED.
LABS
ADMIN.

EXAMPLE: ANDREWS H.S., ANDREWS, TEXAS

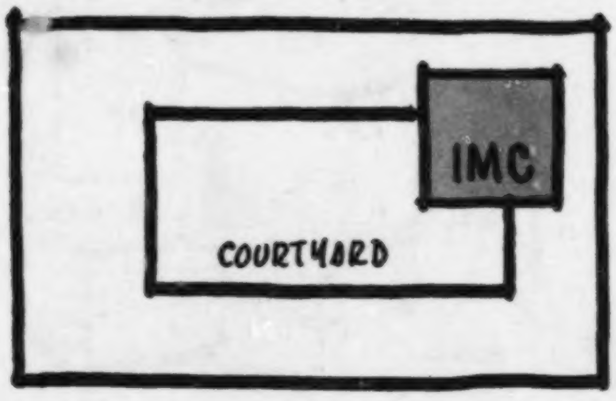
THE IMC AS THE HEART OF A CAMPUS-



THE IMC AT THE CORE OF A LARGE URBAN SCHOOL-

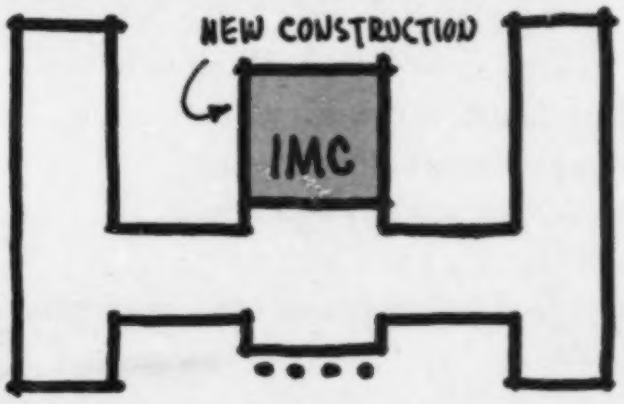


THE IMC WITHIN A HOLLOW RECTANGLE-


IMC
COURTYARD

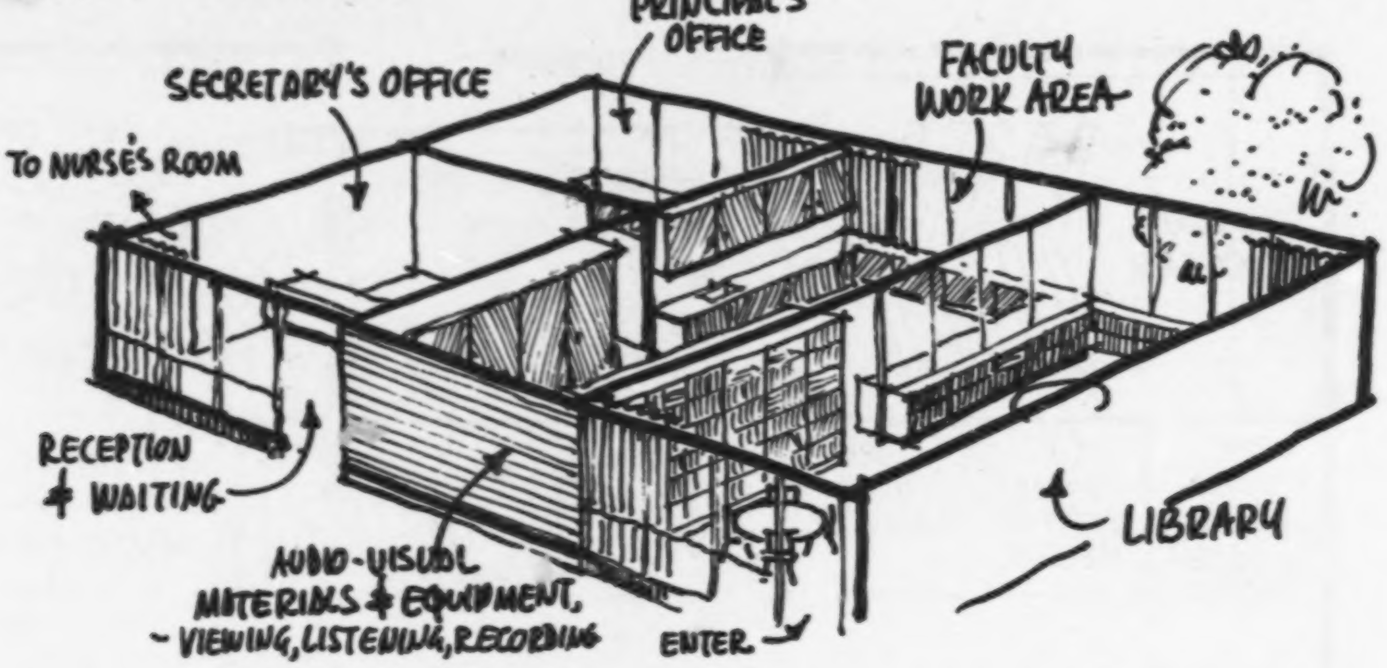
EXAMPLE:
MARSHALL H.S.
PORTLAND, OREGON

THE IMC BUILT AS AN ADDITION TO AN EXISTING OLDER SCHOOL-

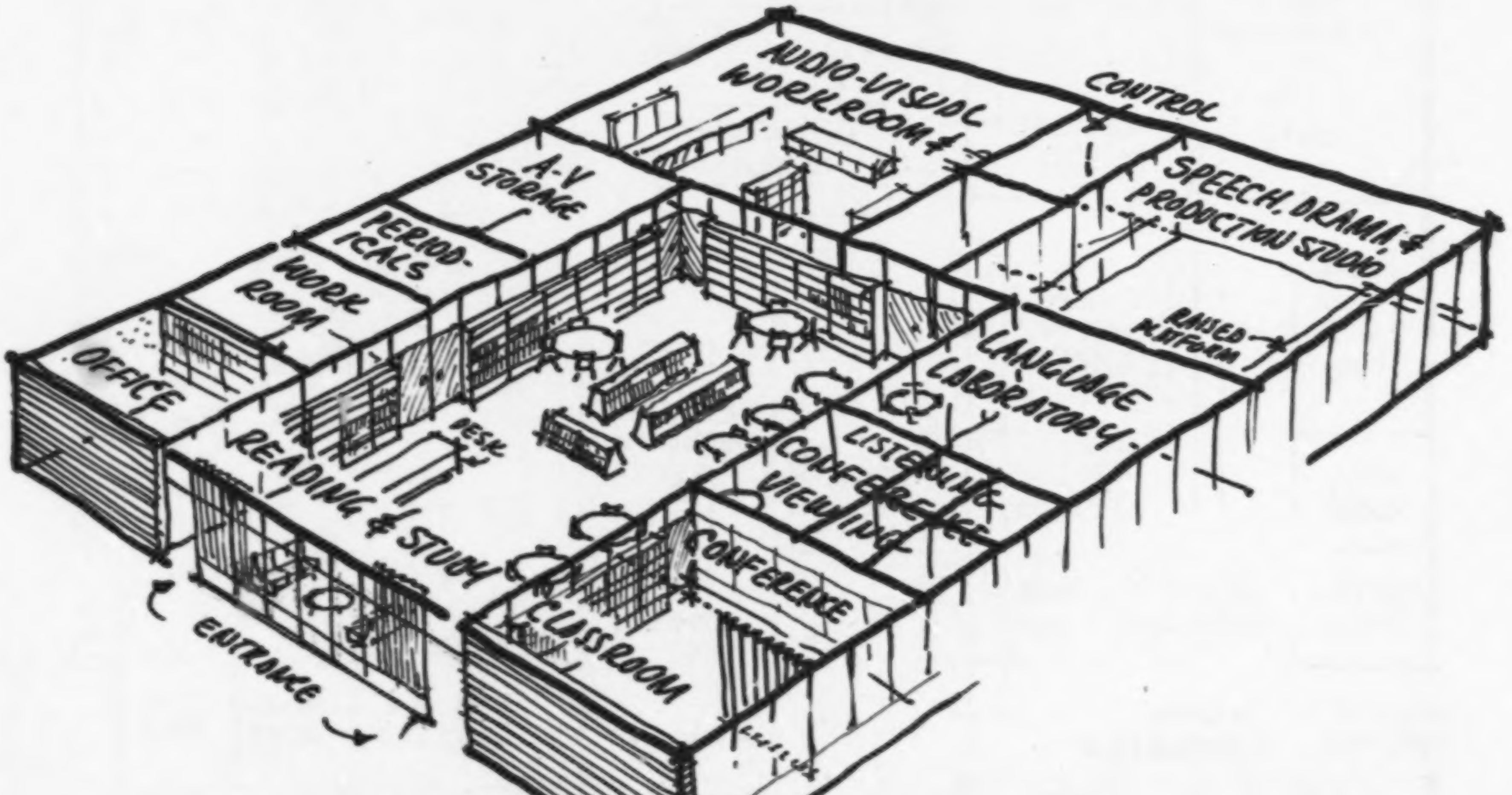

NEW CONSTRUCTION
IMC

EXAMPLE:
GRANT H.S.
PORTLAND, OREGON

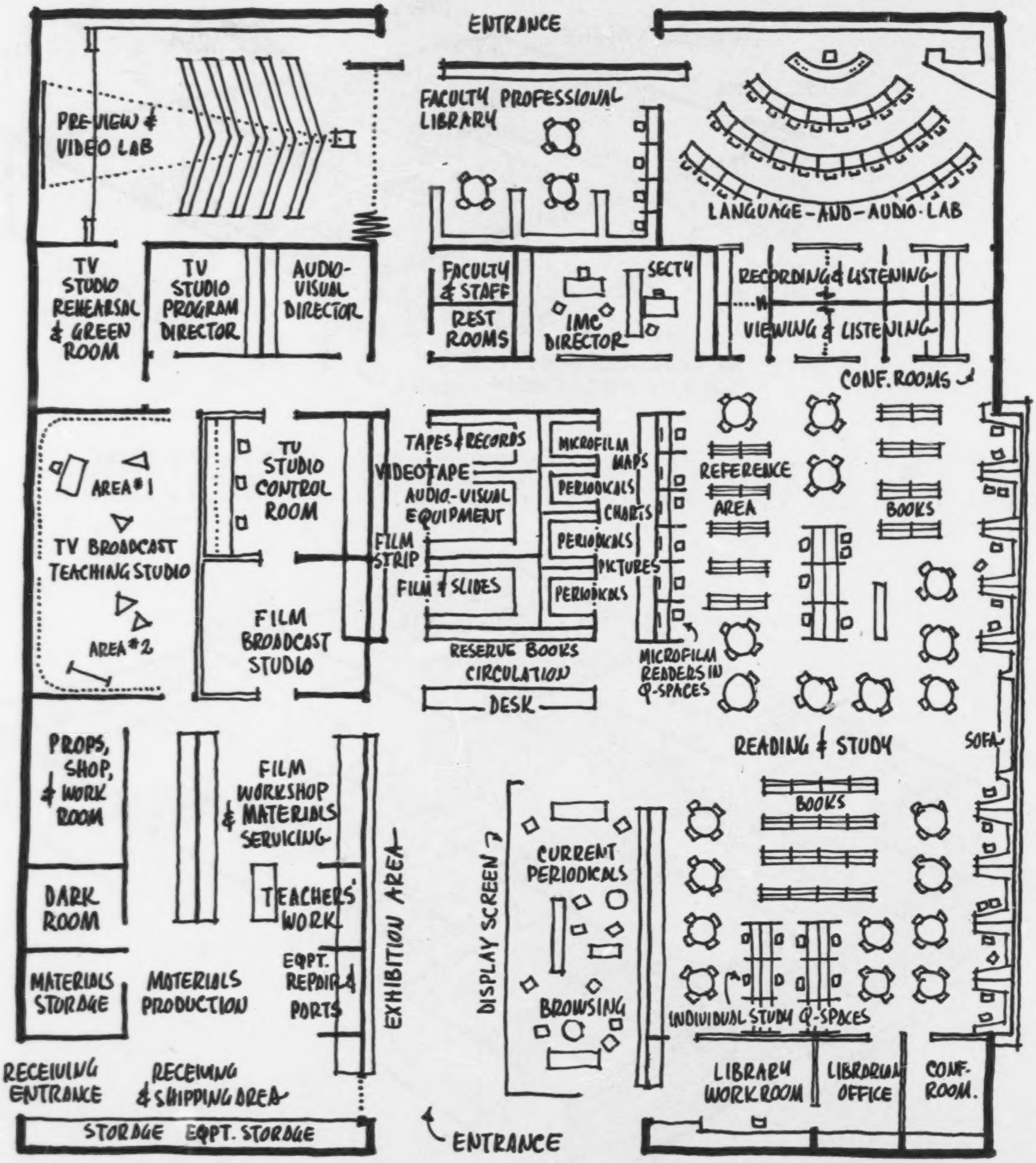
IMC FOR A 200 TO 400 STUDENT ELEMENTARY SCHOOL


PRINCIPAL'S OFFICE
SECRETARY'S OFFICE
FACULTY WORK AREA
TO NURSE'S ROOM
RECEPTION & WAITING
AUDIO-VISUAL MATERIALS & EQUIPMENT, - VIEWING, LISTENING, RECORDING
ENTER
LIBRARY

IMC FOR A 400 TO 800 STUDENT HIGH SCHOOL

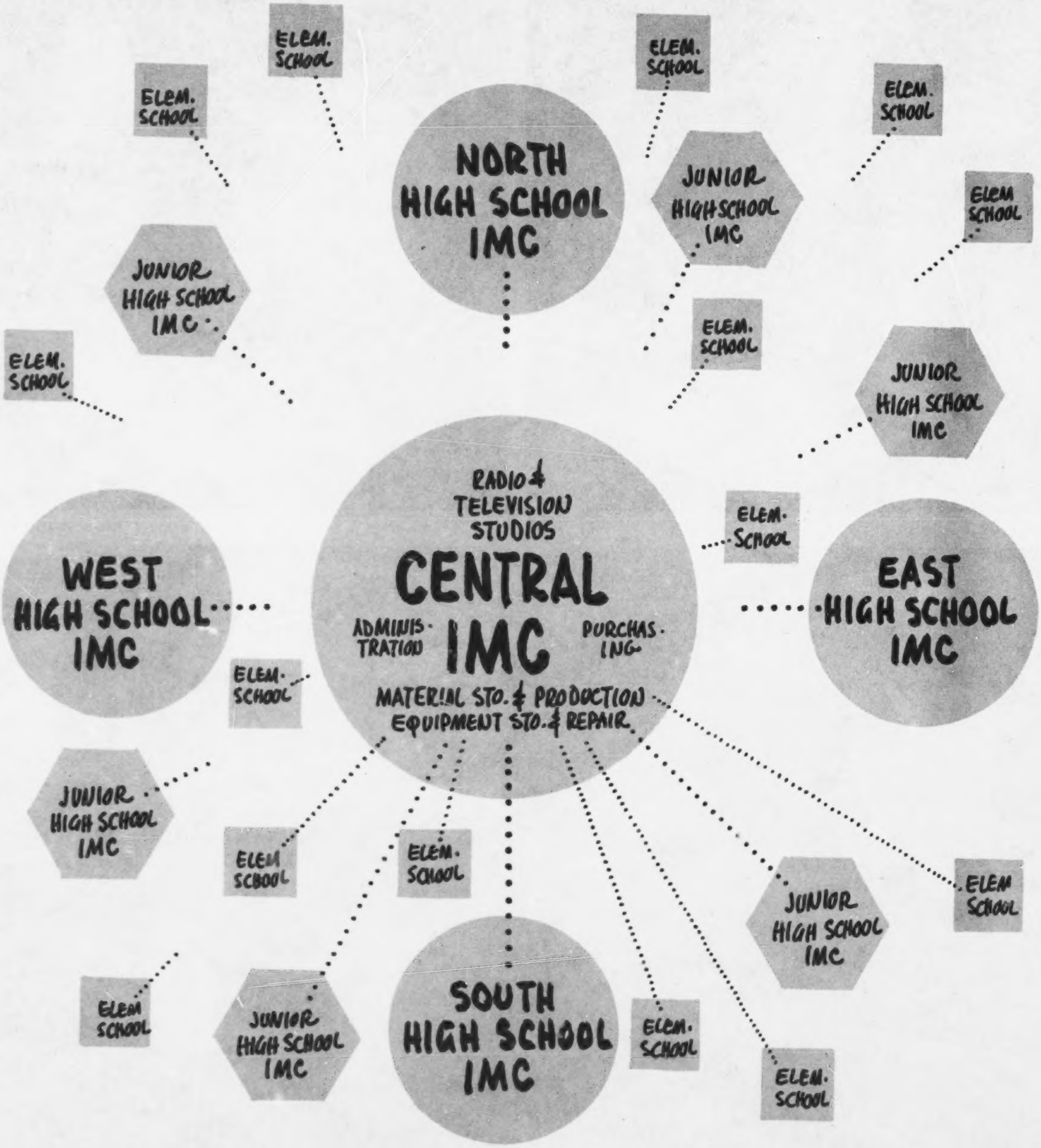

AUDIO-VISUAL WORKROOM &
CONTROL
A-V STORAGE
PERIODICALS
WORK ROOM
OFFICE
SPEECH, DRAMA, & PRODUCTION STUDIO
RAISED PLATFORM
LANGUAGE LABORATORY
LISTENING
CONFERENCE
VIEWING
DESK
READING & STUDY
CONFERENCE
CLASSROOM
ENTRANCE

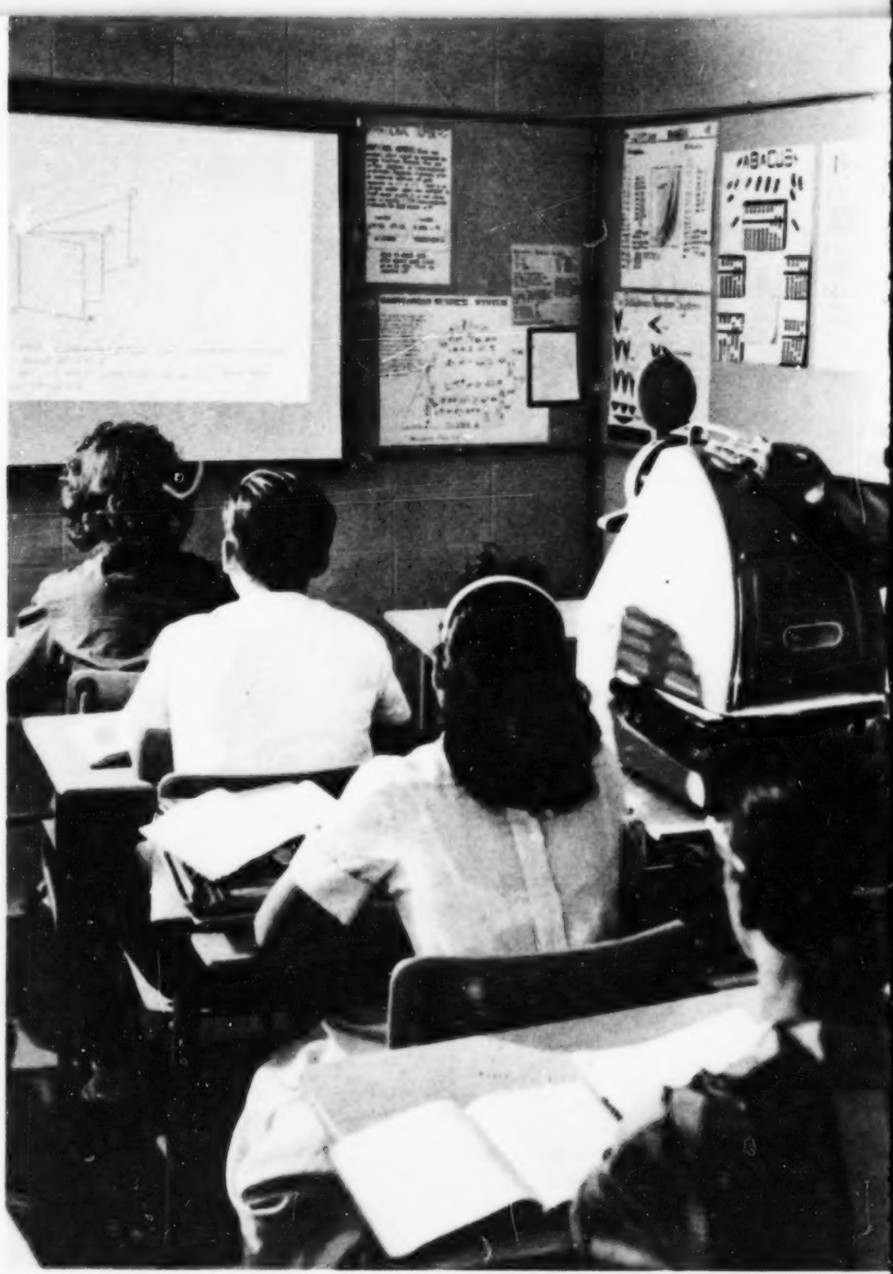
IMC FOR A 1000 TO 2000 STUDENT HIGH SCHOOL


ENTRANCE
PRE-VIEW & VIDEO LAB
FACULTY PROFESSIONAL LIBRARY
LANGUAGE-AND-AUDIO-LAB
TV STUDIO REHEARSAL & GREEN ROOM
TV STUDIO PROGRAM DIRECTOR
AUDIO-VISUAL DIRECTOR
FACULTY & STAFF REST ROOMS
IMC DIRECTOR
SECTY
RECORDING & LISTENING
VIEWING & LISTENING
CONF. ROOMS
AREA #1
TV BROADCAST TEACHING STUDIO
AREA #2
TV STUDIO CONTROL ROOM
FILM BROADCAST STUDIO
TAPES & RECORDS
VIDEOTAPE
AUDIO-VISUAL EQUIPMENT
FILM STRIP
FILM & SLIDES
MICROFILM
MAPS
PERIODICALS
CHARTS
PERIODICALS
PICTURES
PERIODICALS
RESERVE BOOKS
CIRCULATION
DESK
MICROFILM READERS IN Q-SPACES
REFERENCE AREA
BOOKS
READING & STUDY
SOFA
BOOKS
PROPS, SHOP, & WORK ROOM
FILM WORKSHOP & MATERIALS SERVICING
TEACHERS' WORK
DARK ROOM
MATERIALS STORAGE
MATERIALS PRODUCTION
EQPT. REPAIR & PORTS
EXHIBITION AREA
DISPLAY SCREEN
CURRENT PERIODICALS
BROWSING
INDIVIDUAL STUDY Q-SPACES
LIBRARY WORKROOM
LIBRARIAN OFFICE
CONF. ROOM.
RECEIVING ENTRANCE
RECEIVING & SHIPPING AREA
STORAGE
EQPT. STORAGE
ENTRANCE

INTER-RELATED INSTRUCTIONAL MATERIALS CENTERS

IMC


ELEM. SCHOOL
ELEM. SCHOOL
NORTH HIGH SCHOOL IMC
ELEM. SCHOOL
JUNIOR HIGH SCHOOL IMC
ELEM. SCHOOL
ELEM SCHOOL
JUNIOR HIGH SCHOOL IMC
ELEM. SCHOOL
ELEM. SCHOOL
JUNIOR HIGH SCHOOL IMC
RADIO & TELEVISION STUDIOS
CENTRAL IMC
ADMINIS-TRATION
PURCHAS-ING
MATERIAL STO. & PRODUCTION
EQUIPMENT STO. & REPAIR
WEST HIGH SCHOOL IMC
ELEM. SCHOOL
EAST HIGH SCHOOL IMC
ELEM. SCHOOL
JUNIOR HIGH SCHOOL IMC
ELEM SCHOOL
ELEM. SCHOOL
JUNIOR HIGH SCHOOL IMC
ELEM SCHOOL
ELEM SCHOOL
JUNIOR HIGH SCHOOL IMC
SOUTH HIGH SCHOOL IMC
ELEM. SCHOOL
ELEM. SCHOOL



ABOVE: CHICAGO PUBLIC SCHOOLS

BELOW: RALPH R. SMITH SCHOOL, HYDE PAR

PLANNING THE CLASSROOM FOR NEW INSTRUCTIONAL MEDIA

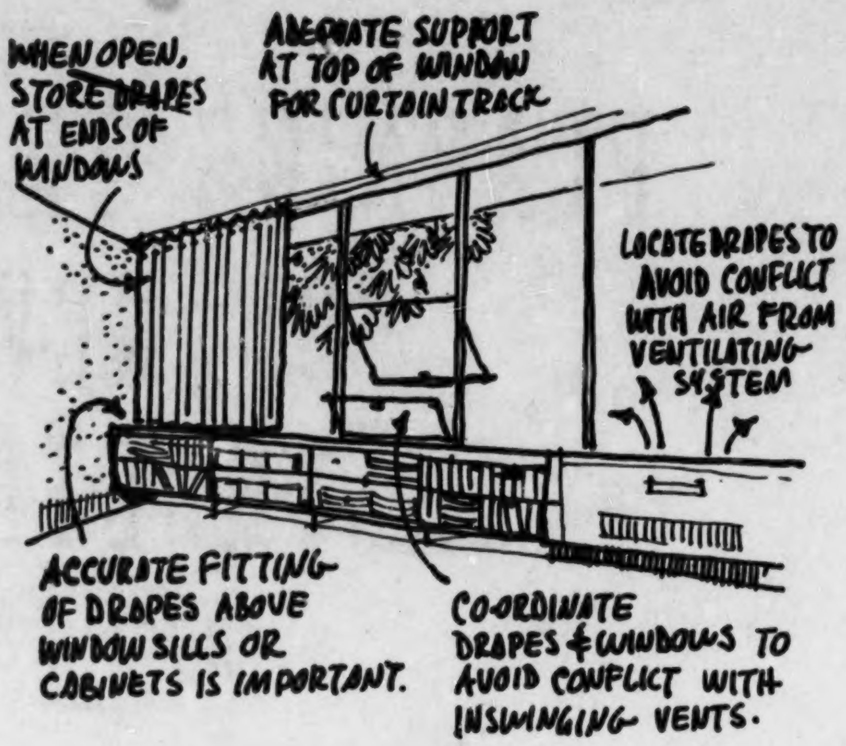
When auditory and visual media are used appropriately in the classroom, explanations are made lucid, time of presentation is lessened, and pupil interest quickened. Through the use of such media as films and television, the teacher is able to extend his teaching beyond the confines of his personal knowledge, a need which assumes new importance as human knowledge expands and the requirements of education become more diverse.

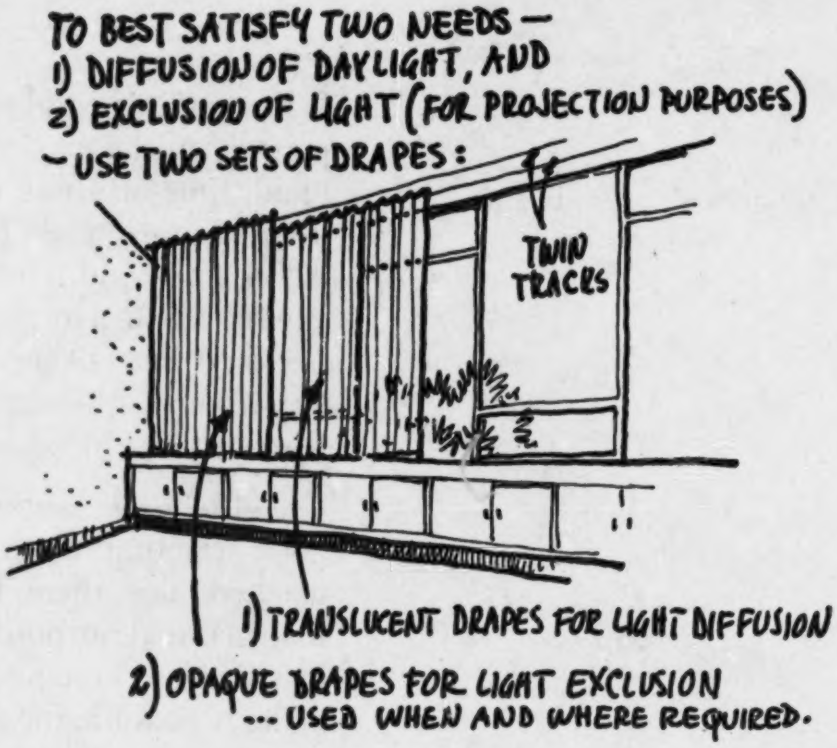
Use of new educational media does not guarantee good teaching. Such media are valuable only if teachers use them to promote clearly defined instructional purposes, and if working conditions, distribution systems, supplies, and equipment make it possible for teachers to use materials and equipment as they need them.

Recommendations in this section summarize research and professional opinion regarding classroom lighting, ventilating and heating, sound control, electrical wiring, and other matters which must be carefully planned if the classroom is to be suited to the use of modern teaching media.

"Classroom," in this chapter, refers to all instructional areas except gyms, multi-purpose rooms, auditoriums, industrial arts shops, home economics laboratories, science laboratories, language laboratories, and other specialized areas where use of instructional media is atypical due to the nature of instruction or to to the unusual physical properties of the room. For these special rooms, the suggestions found in this chapter should be used selectively.

LIGHT CONTROL


WHEN OPEN, STORE DRAPES AT ENDS OF WINDOWS
ADEQUATE SUPPORT AT TOP OF WINDOW FOR CURTAIN TRACK
LOCATE DRAPES TO AVOID CONFLICT WITH AIR FROM VENTILATING SYSTEM
ACCURATE FITTING OF DRAPES ABOVE WINDOW SILLS OR CABINETS IS IMPORTANT.
CO-ORDINATE DRAPES & WINDOWS TO AVOID CONFLICT WITH INSWINGING VENTS.


TO BEST SATISFY TWO NEEDS —
1) DIFFUSION OF DAYLIGHT, AND
2) EXCLUSION OF LIGHT (FOR PROJECTION PURPOSES)
— USE TWO SETS OF DRAPES:
TWIN TRACKS
1) TRANSLUCENT DRAPES FOR LIGHT DIFFUSION
2) OPAQUE DRAPES FOR LIGHT EXCLUSION
--- USED WHEN AND WHERE REQUIRED.

General

Light control should insure the pupil's visual comfort and efficiency. Effective use of audio-visual equipment requires that light control provide proper illumination of work surfaces for visual tasks and light contrasts on the various surfaces of the room that are neither distracting nor visually tiring. Following are suggestions for general light control.

In planning clerestory, skylights, or large window areas, problems of light control should be carefully considered.

Control of both natural and artificial light should be provided.

Artificial light control may be accomplished with a dimmer system or with parallel light systems that give a choice of illumination.

Light on projection screens should be reduceable almost to darkness (some authorities suggest control to one-tenth foot-candle). This is necessary for use of the opaque projector.

All sources of distracting stray light should be eliminated when the room is darkened.

In classrooms where note-taking is required when projected materials are shown, pupil work surfaces should have up to one foot-candle of glare-free light directed down and away from the screen.

Natural Light Control

Although it is recommended that light should be controlled primarily by electrical means, the control of natural light is and will remain a necessity in classrooms. The following means of control have proved satisfactory.

Drapes. Opaque, fire resistant drapes are easily cleaned, and relatively inexpensive. Pull drapes mounted on permanent tracks are convenient, efficient, need not obstruct ventilation, and are available in attractive colors. Following are suggestions for use of drapes.

Should effectively eliminate distracting outside light. (Valences and baffles may be used for this purpose. Drapes should be of sufficient size to extend beyond all edges of glass area.)

Should be fire resistant.

Should be mounted so that teacher or pupils can manipulate them easily. Pulling cord should be installed to operate easily and freely.

Should be mounted to allow proper ventilation, where ventilation is dependent on windows.

Should occupy minimum usable wall or window space when not in use.

Should be easily cleaned.

Should be durable and resistant to fading.

Should have track and carriers with size and weight appropriate to the drape to be supported.

Should be supported on mounting strips of sufficient strength.

LIGHT CONTROL

Shades. For certain types of windows, shades are a practical and useful means of controlling natural light. Ordinarily they require border strips to prevent light leakage. Channels and metal border strips have been found to produce shade operation difficulties. Following are suggestions for the selection and installation of shades.

Should effectively eliminate outside light and prevent light leaks. (Shades should be sufficient in size to extend well beyond glass area on all sides. Border strips that do not bind or cause undue wear should be provided.)

Should be lightweight, durable, fire resistant, and easy to clean.

Should be permanently installed, not portable.

Should not be installed where ventilation is dependent on windows alone.

Should have trouble-free system for lowering and raising.

Venetian Blinds. Specially constructed full-closure blinds have been found to be very effective for natural light control. Ordinary venetian blinds are not recommended because of light leakage. Following are suggestions for the selection and use of venetian blinds.

Should be durable and easy to maintain.

Should be easy to clean. Slats should be easy to remove.

Should effectively eliminate outside light.

Where ventilation is dependent on windows, installation should recognize ventilation requirements.

Should be easy to manipulate.

Louvers and Jalousies. Properly designed and installed, louvers and jalousies can be used effectively to control natural lighting in classrooms. Following are suggestions for the selection and installation of louvers and jalousies.

Should be durable.

Should be rust resistant.

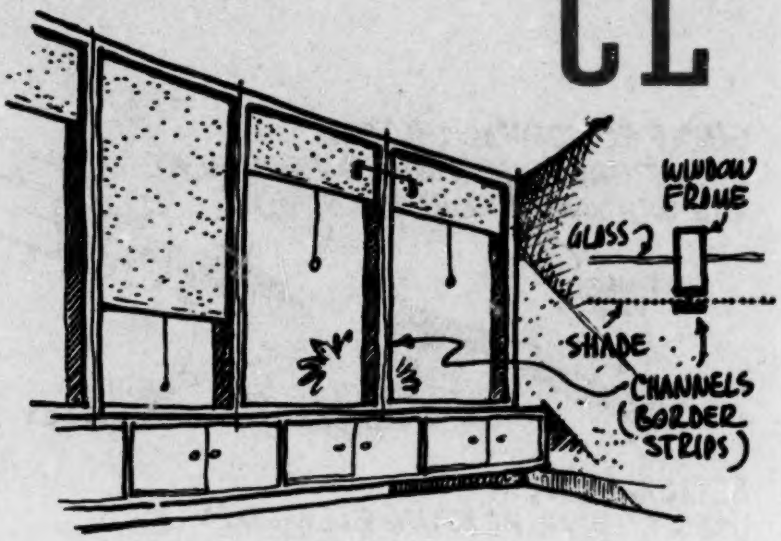
Must effectively eliminate stray light.

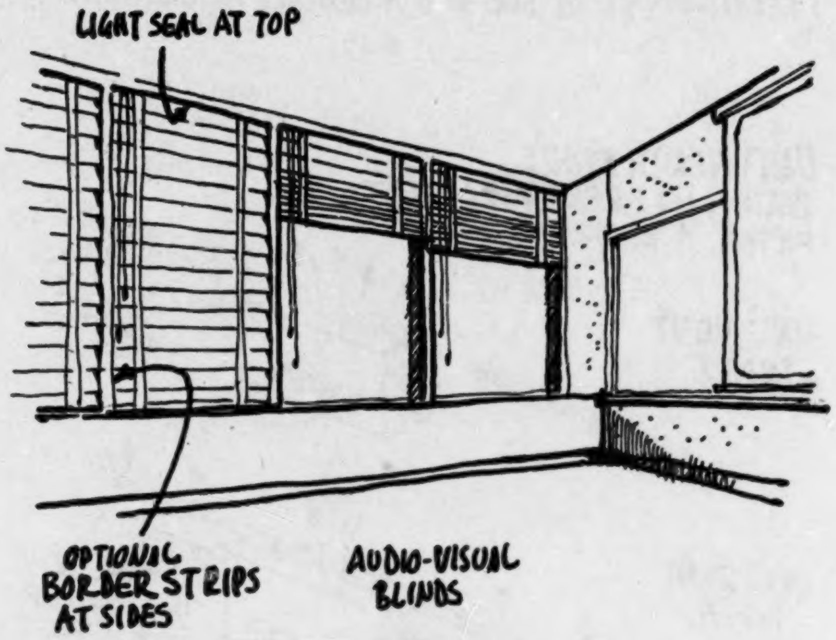
Should provide easy access to windows for cleaning purposes.

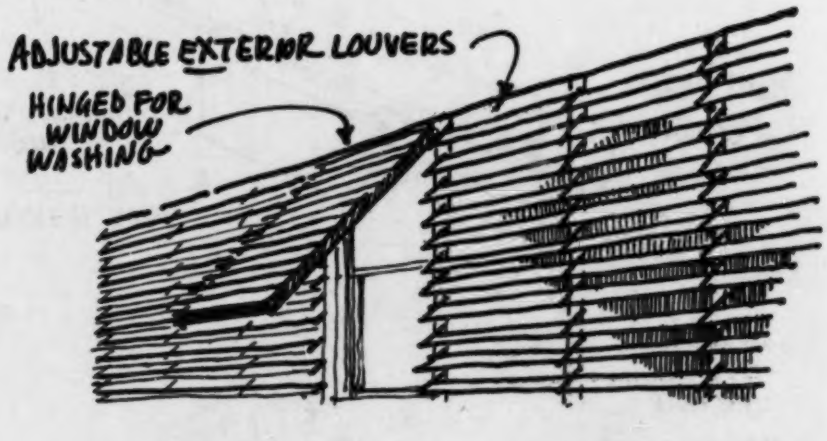
Non-glare finishes are recommended for louvers to avoid undesirable reflection of light into the classroom.

Should not be installed for darkening purposes where ventilation is dependent on windows they would cover.

Should be adjustable by cranks or levers convenient for use of pupils and teacher.







VENTILATION AND HEATING

Probably no aspect of classroom physical environment has more effect on learning than heating and ventilation. Classrooms within the same building differ in window exposure, number of pupils, activities, and lighting, all of which contribute to differences in room temperature at different times. Children alone contribute 500-800 BTU's of heat per hour per pupil. Reliance on teachers to open windows may result in unintentional overheating and loss of learning efficiency.

Special problems are created when windows or other apertures used for ventilation must be darkened for use of projected materials. Following are suggestions for ventilation and heating.

Automatic individual classroom control is desirable. The physical comfort of children should be the objective of the heating-ventilating system, and maintenance of a relatively constant, comfortable room temperature contributes to this objective.

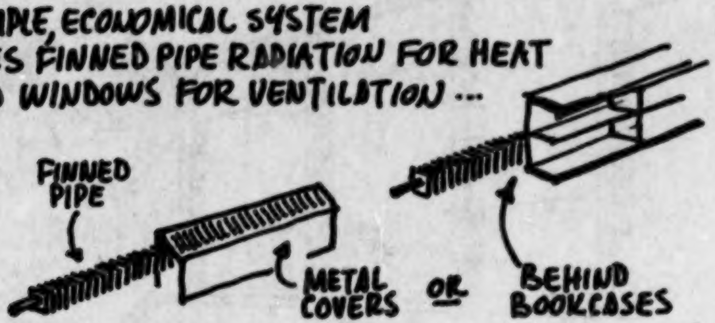
Normally, six to ten complete changes in room air per hour have been found desirable.

The heating-ventilating system should provide both for heating and cooling.

The heating-ventilating system should be quiet; ducts should be designed to minimize noise. Separate duct systems should serve noise and non-noise producing areas in the school. The mechanical engineer should specify the proper vibration and noise isolation equipment for ventilating fans and air compressors.

Where unit ventilators are used, units that operate quietly should be specified.

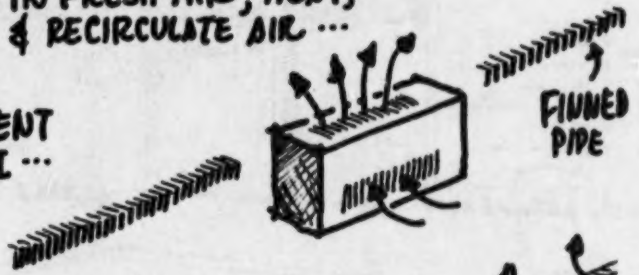
SIMPLE, ECONOMICAL SYSTEM
USES FINNED PIPE RADIATION FOR HEAT
AND WINDOWS FOR VENTILATION ...


FINNED PIPE
METAL COVERS
OR
BEHIND BOOKCASES

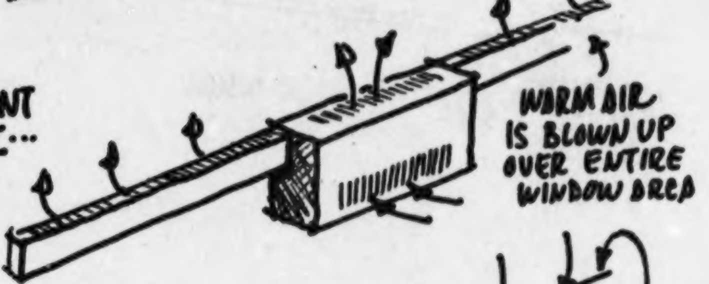
BETTER SYSTEM
USES SIMILAR HEATING ELEMENTS
BUT ADDS MECHANICAL EXHAUST SYSTEM.
(RELATIVELY SMALL DUCTS TO A CENTRAL EXHAUST FAN.)

UNIT VENTILATORS
BRING IN FRESH AIR, HEAT,
FILTER, & RECIRCULATE AIR ...

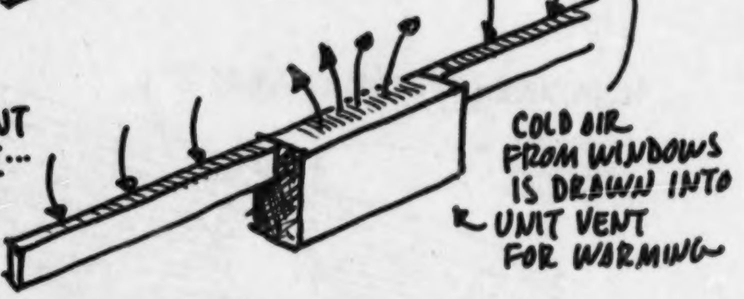
UNIT VENT
TYPE I ...


FINNED PIPE

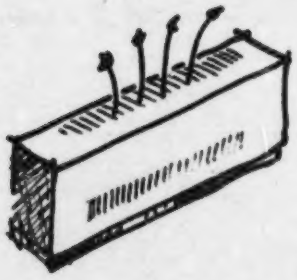
UNIT VENT
TYPE II ...

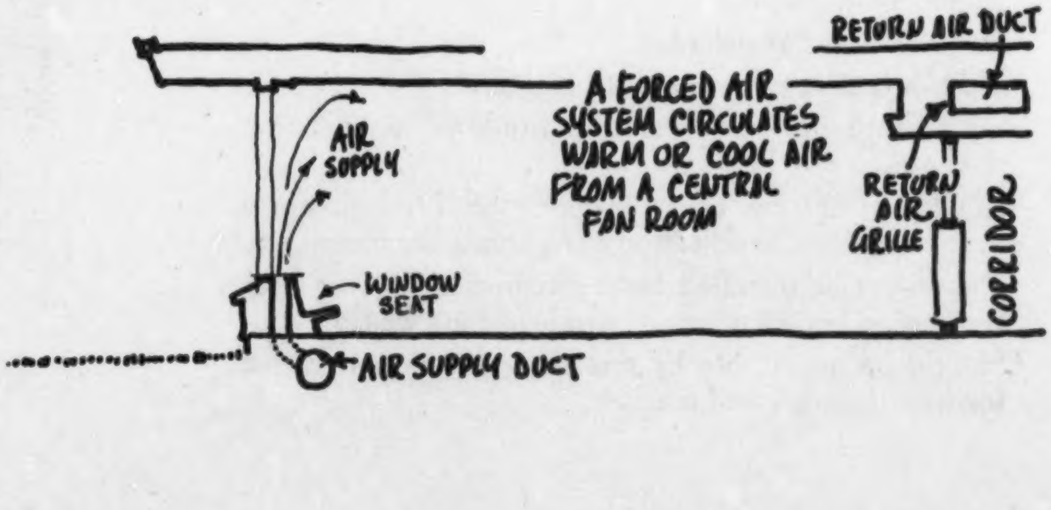

WARM AIR IS BLOWN UP OVER ENTIRE WINDOW AREA

UNIT VENT
TYPE III ...


COLD AIR FROM WINDOWS IS DRAWN INTO UNIT VENT FOR WARMING

COOLING
MAY BE ADDED ...




RETURN AIR DUCT
A FORCED AIR SYSTEM CIRCULATES WARM OR COOL AIR FROM A CENTRAL FAN ROOM
AIR SUPPLY
RETURN AIR GRILLE
CORRIDOR
WINDOW SEAT
AIR SUPPLY DUCT

SOUND CONTROL

With the increasing use of projectors, recording and playback equipment, closed-circuit TV, radio, and intercommunications systems, the acoustical requirements of classrooms must be carefully considered. Following are suggestions for classroom sound control.

Where available, an experienced acoustical engineer should be consulted to determine the required acoustical needs of classrooms. The recommendation of the architect should be sought in employing the acoustical engineer.

Noisy areas such as gyms, cafeterias, shops, and music rooms should be separated from other classroom areas. In some instances, sound may be controlled by eliminating windows.

Sound insulating qualities of building materials should be considered. Materials used in walls, ceilings, floors, and insulation affect the noise level of the classroom. Need for special acoustical treatment in the classroom will depend partly on other materials used both in the classroom and in adjacent areas of the building.

Control of sound transmission between rooms should be provided in the structural design of the building. Transmission through partitions, ceilings, and floors should be considered.

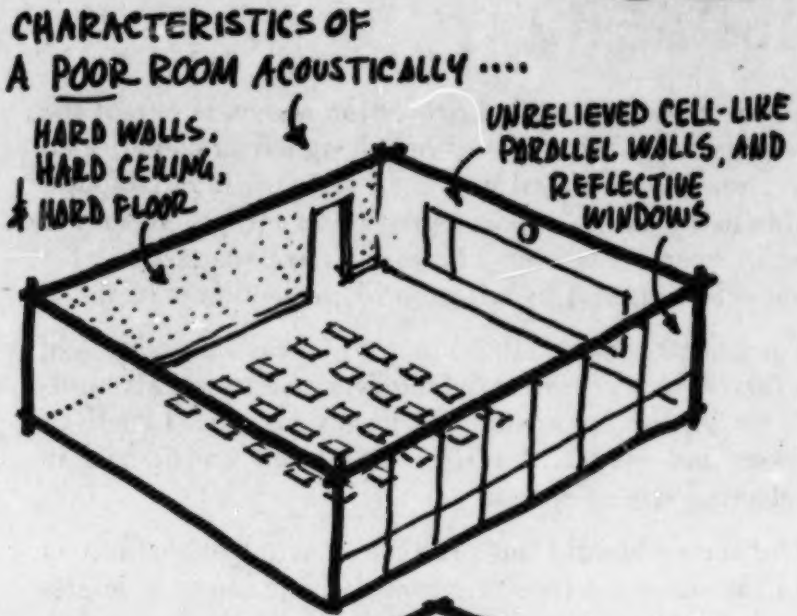
The center surfaces of classroom ceilings should be hard and sound reflective.

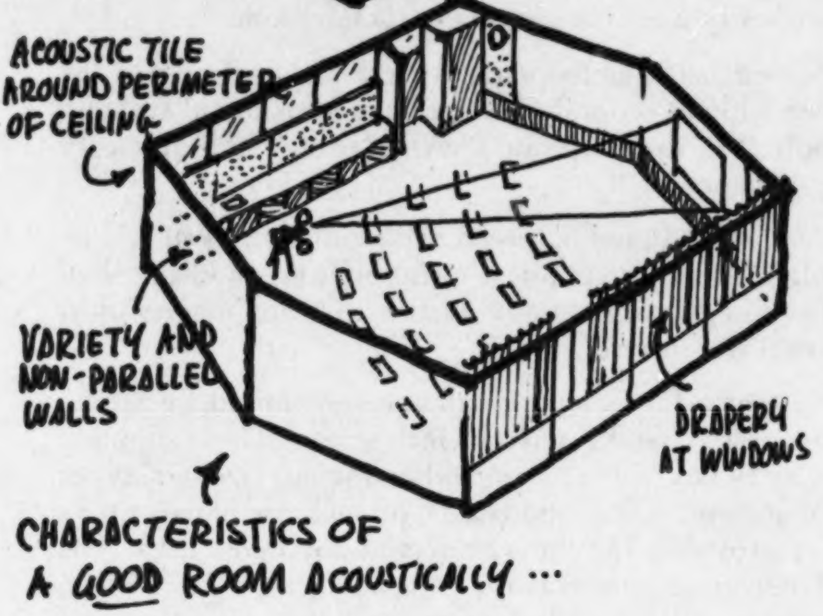
The classroom ambient noise level should normally be low enough that speech may readily be heard. Fluorescent lighting contributes to the ambient noise level of the classroom and ballasts should be selected with this in mind.

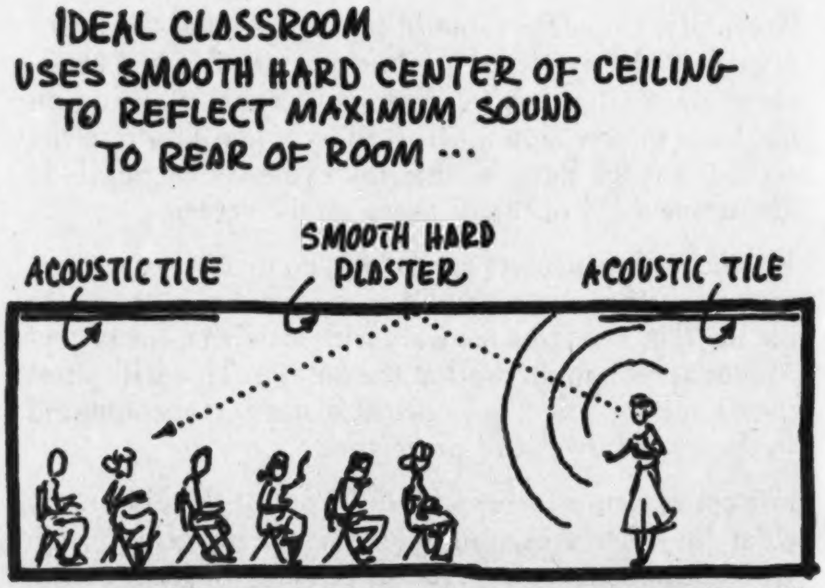
Where special control of excessive reverberation is required, it can sometimes be achieved through use of drapes. Installation of sound panels or other structural modifications should be attempted only on the advice of an acoustical engineer.

The building should be oriented to minimize environmental noises in the classrooms.

The heating and ventilating system should be planned to minimize noise (see Ventilation and Heating, page 26).


CHARACTERISTICS OF
A POOR ROOM ACOUSTICALLY ....
HARD WALLS.
HARD CEILING,
& HARD FLOOR
UNRELIEVED CELL-LIKE
PARALLEL WALLS, AND
REFLECTIVE
WINDOWS


ACOUSTIC TILE
AROUND PERIMETER
OF CEILING
VARIETY AND
NON-PARALLEL
WALLS
DRAPERY
AT WINDOWS
CHARACTERISTICS OF
A GOOD ROOM ACOUSTICALLY ...


IDEAL CLASSROOM
USES SMOOTH HARD CENTER OF CEILING-
TO REFLECT MAXIMUM SOUND
TO REAR OF ROOM ...
ACOUSTIC TILE
SMOOTH HARD
PLASTER
ACOUSTIC TILE
MOST EFFICIENT USE OF ACOUSTIC TILE IS AROUND
PERIMETER OF ROOM ONLY — ON CEILING OR WALL!

SCREENS

The presence of a good projection screen is one of the requirements of a classroom designed and equipped for new instructional media. A screen which is adaptable to the uses of modern projection equipment should be in every classroom. Following are suggestions for the selection and installation of projection screens.

For most rooms a 70x70-inch screen is desirable and a 60x60-inch screen satisfactory, considering all kinds of projection apparatus which may be used. Length of room and height of ceiling should be considered in selecting size of screen.

The screen should not produce unusual distortions or variations in surface brightness when viewed at angles normally used for viewing in a classroom.

Screens such as lenticular or glass ones designed for use without room darkening have been found suitable only for small group viewing using high intensity projectors.

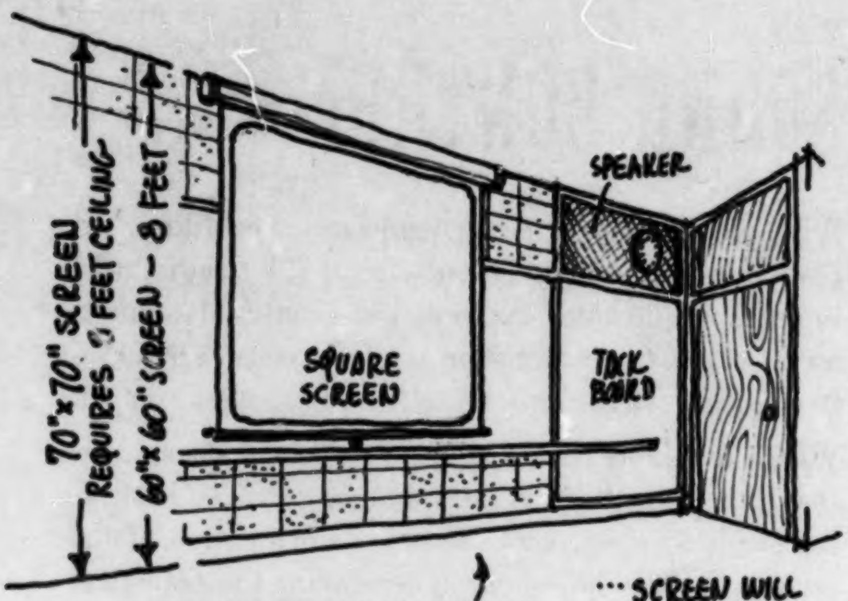
As a rule of thumb, screen and seating areas should be planned so that pupils viewing will be no closer than two image widths and no further than six image widths from the screen.

Supports for hanging wall screens should be strong enough to handle a 70x70-inch screen. These supports may be flexible to accommodate various sizes and types of screens, maps, and charts, or separate hangers may be provided for the screen and for other uses. The latter arrangement is recommended, for a 70x70-inch screen will normally have to be fixed above the level of the top of the chalkboard or the screen will be too low for viewing.

Normally, the screen should be hung so that the lower edge is at the eye level of children seated in the classroom. If seating can be arranged so that children do not have their vision obstructed by other children, the screen may be hung so that the eye-level of pupils is about one-third of the distance up the screen.

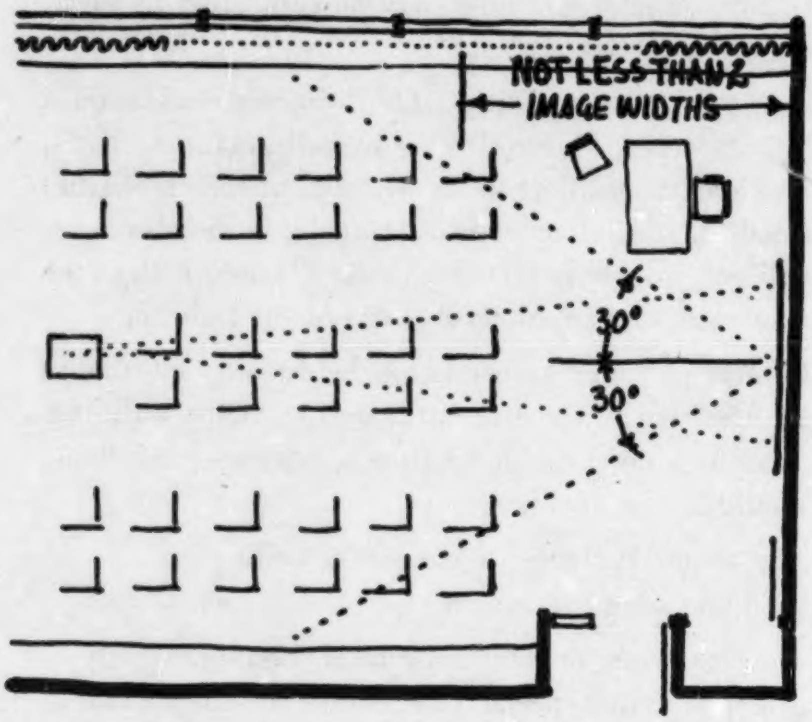
If overhead projectors are to be used to best advantage, the top of the screen should be suspended by brackets about 18 inches from the wall, with provision for fastening the screen to the wall at the bottom. This will offset the "keystone effect" or optical distortion encountered in the use of overhead projectors.

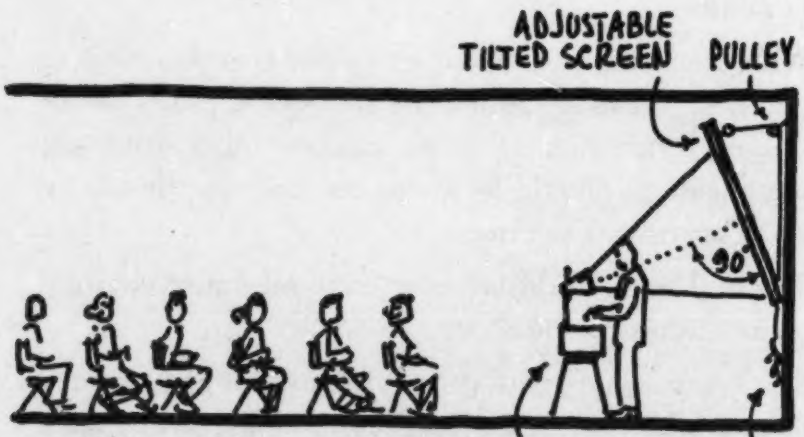
For convenience in keeping the front of the classroom clear for other uses, and to give better image coverage from classroom seating, the screen may be hung to one side of the center of the front, with the side of the screen away from the center held out from the wall. This would require specially designed brackets.



MOUNT SCREEN AT CEILING (NOT AT TOP OF CHALK BOARD)

...SCREEN WILL ACCOMODATE IMAGE FROM 16 MM PROJECTOR IN CLASSROOM





BIG SCREEN & HIGH ENOUGH = GOOD SIGHT LINES!

WIRING

Use of electronic teaching equipment is in its infancy. Planners of school buildings should think ahead many years to the possible electrical requirements of the classroom and the school plant. Accessibility to raceways and conduits and adaptability of the entire wiring system to changes that may be needed in the future are paramount considerations. Following are suggestions for classroom wiring.

Ampere and voltage requirements should be determined by an electrical engineer who should be informed regarding the electrical equipment and circuiting needs of the building. In general, a minimum of 20 amperes should be provided for each double outlet in regular classrooms.

A light switch should be located at the door and the light control switch or dimmer should be located in the position most convenient to the operator of projection equipment.

Outlets and lighting for each classroom should be on separate circuits.

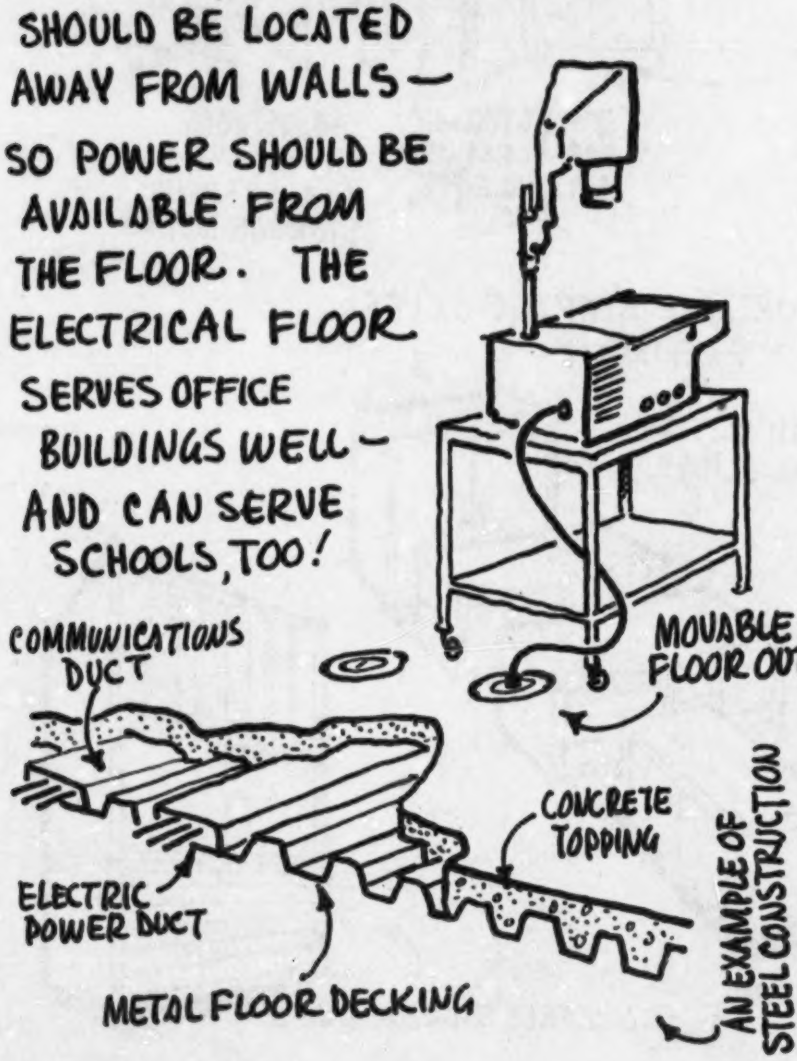
Outlets should be provided on all sides of the room. With the amount and variety of equipment now in use, three double outlets per wall is desirable for classrooms.

Wall outlets should be installed high enough to avoid dirt and floor wax, at a level convenient to reach but not so high as to invite tampering by students. For most classrooms 18" has been found to be a convenient height.

Outlets should be provided above work surfaces.

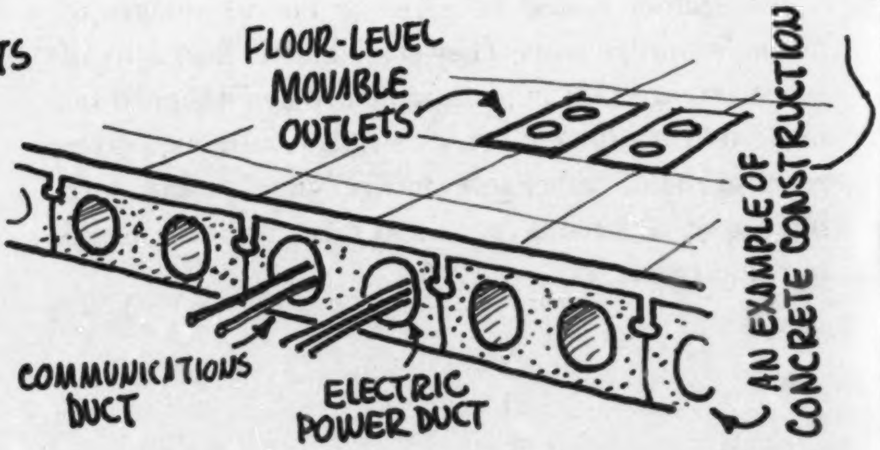
All outlets should be grounded.

Conduits should be over-size to permit alterations and additions to wiring, and raceways should be accessible.



FOR EFFECTIVE TEACHING— PROJECTORS, RECORDERS, AND OTHER KINDS OF EQUIPMENT FREQUENTLY SHOULD BE LOCATED AWAY FROM WALLS— SO POWER SHOULD BE AVAILABLE FROM THE FLOOR. THE ELECTRICAL FLOOR SERVES OFFICE BUILDINGS WELL— AND CAN SERVE SCHOOLS, TOO!

AN EXAMPLE OF STEEL CONSTRUCTION



AN EXAMPLE OF CONCRETE CONSTRUCTION

STORAGE

As a teacher becomes adept at using instructional devices he will find that well-planned storage is one of his most urgent needs. Needs for storage will vary both with the extent of use of audio-visual materials and with the over-all system of storage and distribution. A highly centralized system of audio-visual supplies and equipment will require less classroom storage, a highly decentralized system more classroom storage. In planning storage, the following principles should be helpful.

Classroom storage should be planned to complement the over-all school and school district system of storage and distribution.

Storage should not be amassed in one place, but should be arranged so that congestion is avoided in its use.

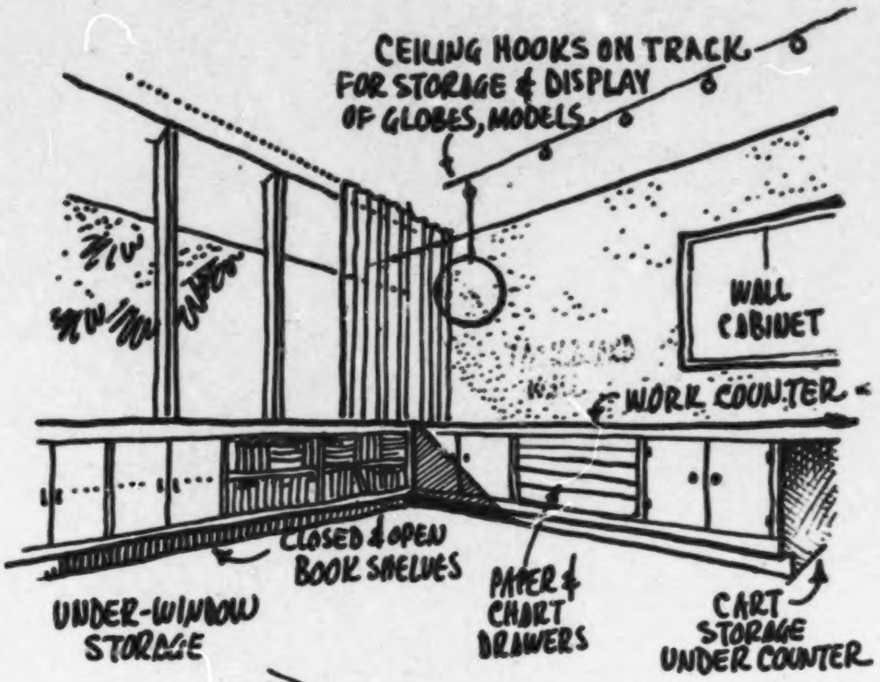
The amount of storage should make possible full and desirable use of instructional media by the teacher.
Storage should be located close to the areas where the materials or equipment will be used.

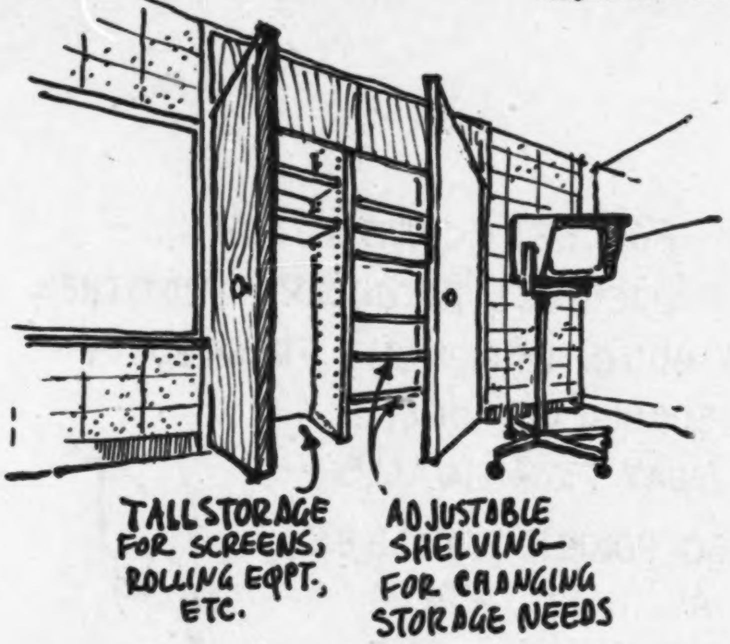
Closed shelving is needed for materials and equipment that are little used or need special protection. For materials that are frequently used, open shelving should be provided. It is more accessible and more conducive to good housekeeping.

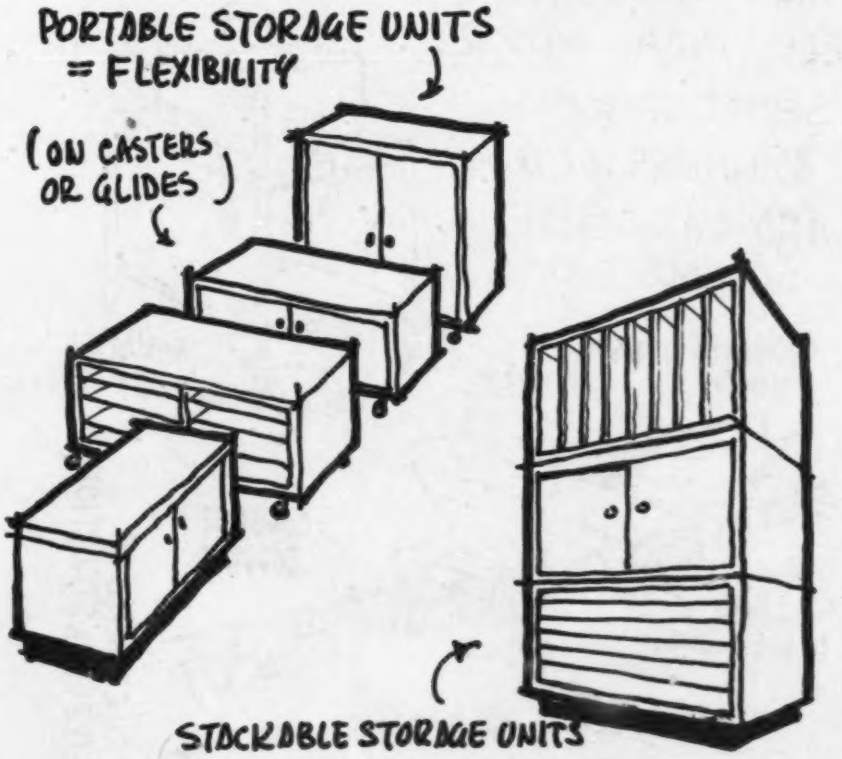
Fire resistant storage for flammable or volatile liquids should be provided.

Adjustable shelving should be used when storage dimensions may need to be changed in the future. Storage of fixed dimensions not designed for particular uses should be avoided.

Consideration should be given to the advantages of portable storage units. They contribute to flexibility of space arrangement in a classroom. When designed for projection equipment, they can also be moved from room to room. "Stackable storage" units permit flexible use of classroom space and are especially useful in primary grades.


CEILING HOOKS ON TRACK FOR STORAGE & DISPLAY OF GLOBES, MODELS
WALL CABINET
WORK COUNTER
CLOSED & OPEN BOOK SHELVES
UNDER-WINDOW STORAGE
PAPER & CHART DRAWERS
CART STORAGE UNDER COUNTER


TALL STORAGE FOR SCREENS, ROLLING EQPT., ETC.
ADJUSTABLE SHELVING FOR CHANGING STORAGE NEEDS


PORTABLE STORAGE UNITS = FLEXIBILITY
(ON CASTERS OR GLIDES)
STACKABLE STORAGE UNITS

PREPARATION AND CONFERENCE AREA

A preparation area should be provided in conjunction with the classroom as well as in the building's instructional materials center. Teachers and pupils should have access to space, equipment, materials, and storage which make it both possible and convenient for them to prepare, or have prepared, the charts, slides, models, and other materials they need. If such a space is provided with the classroom, it should be planned to serve a number of purposes:

The area should be designed for multi-purpose uses, including materials preparation, conferences, individual or small group study, and classroom library research.

The area should, if possible, be isolated from the classroom and soundproofed so that the activities just described may be carried on without disturbing the class. Preparation areas within the classroom preclude certain of these uses but are, of course, less expensive to provide.

Space should be provided for a work table and four to six chairs.

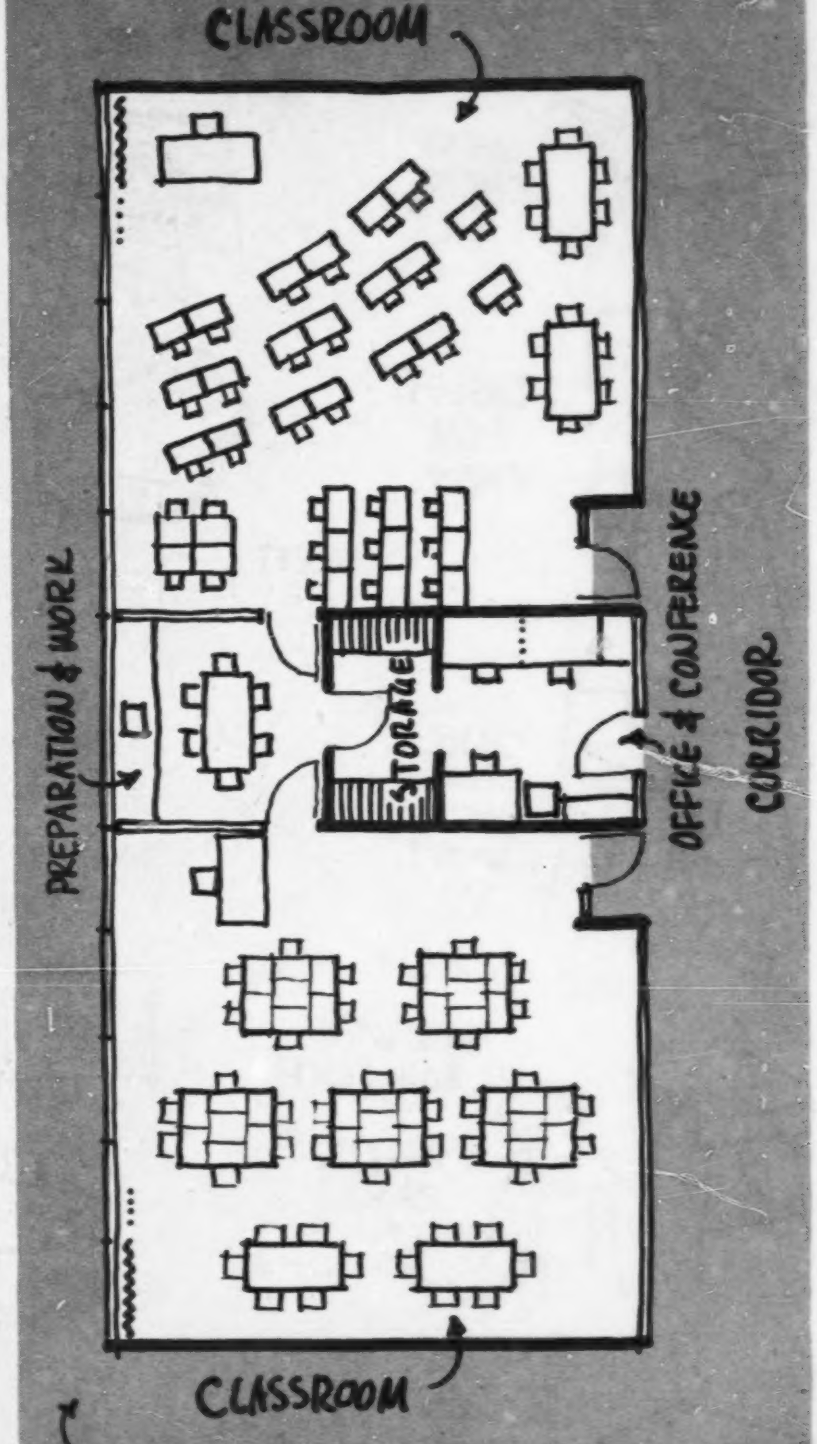
The area should have storage for books, paper cutters, scissors, stencils, varying sizes of construction paper, paints, inks, pencils and crayons, and raw materials used in making models and mock-ups. Storage should be specifically designed for any equipment to be used continuously or frequently in the classroom. Other storage should be flexibly designed because different teachers will use different materials.

The area should be convenient to supervise, and visually accessible from the classroom.

The area should have at least two electrical outlets.

The area should have an adequate quantity and quality of light on working surfaces.

The area should be provided with sink and hot and cold water.



CLASSROOM-WORKROOM-STORAGE-OFFICE DESIGN AS DEVELOPED BY NEWARK HIGH SCHOOL, NEWARK, OHIO. THIS TYPICAL TEACHING SUITE OF 2 CLASSROOMS PLUS WORK-STORAGE-OFFICE IS HEADQUARTERS FOR THREE TEACHERS.

TYPES OF MOVABLE SEATING -

SEATING

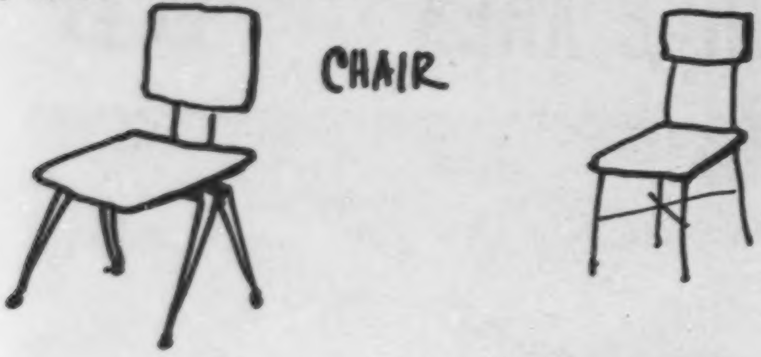
Teachers who use modern media to good advantage will wish to use them at times with only part of their class or even a small group of pupils. Further, when an entire class is involved, the seating may need to be arranged differently, depending on the medium, if optimum viewing or listening conditions are to prevail. The following principles apply to seating as it relates to the use of modern instructional media:

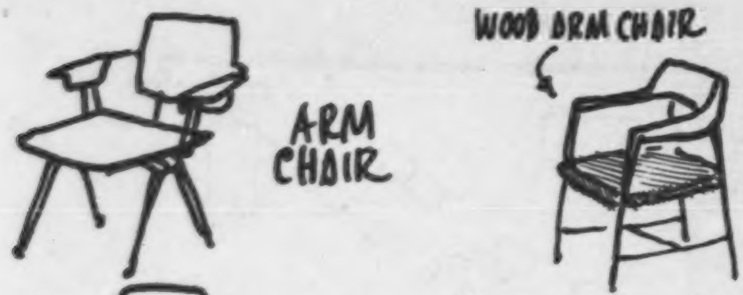
Should be movable and designed for flexible grouping arrangements.

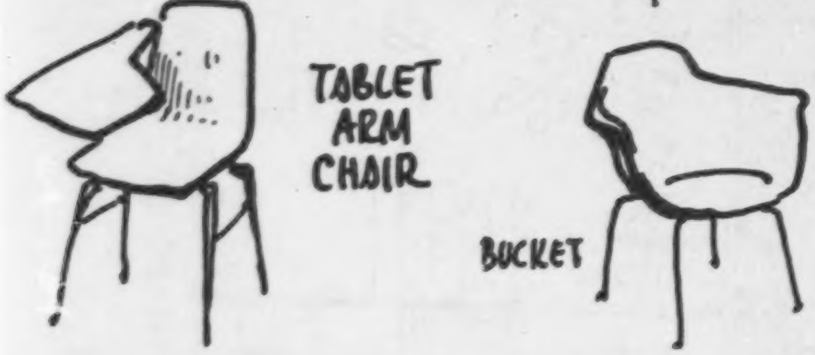
Should be comfortable, and should furnish good posture support.

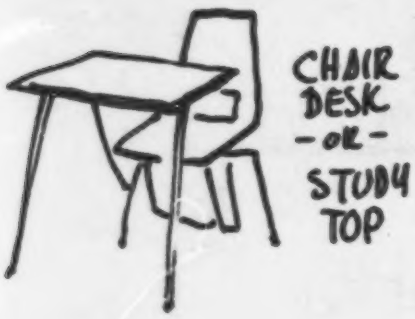
Should be equipped for note-taking where appropriate.

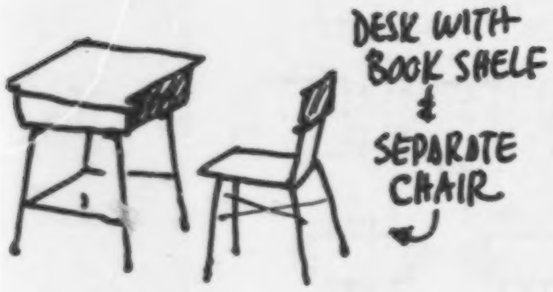
Should not produce noise.

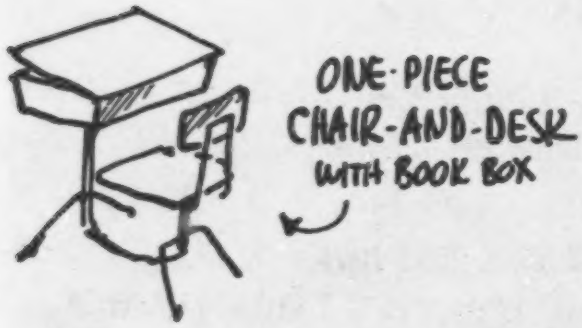


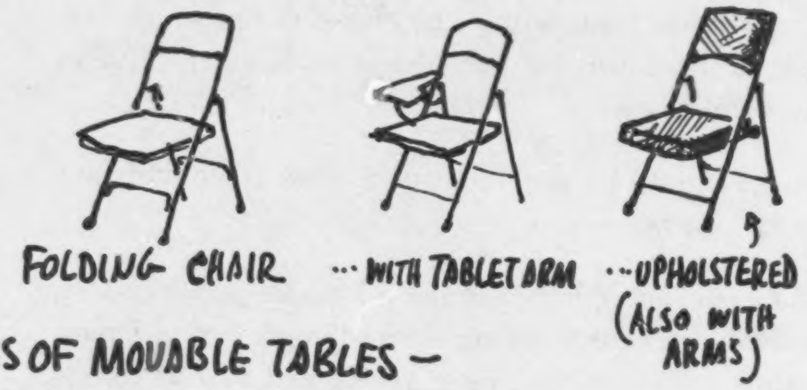

WOOD ARM CHAIR
ARM CHAIR


TABLET ARM CHAIR
BUCKET

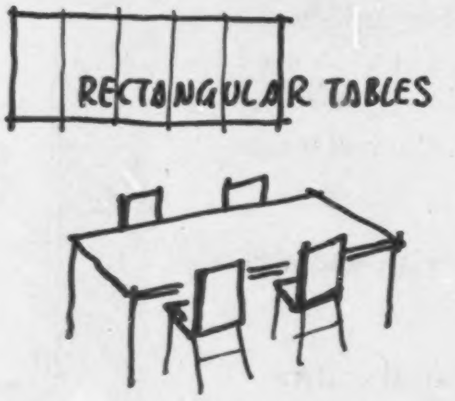

CHAIR DESK -OR- STUDY TOP

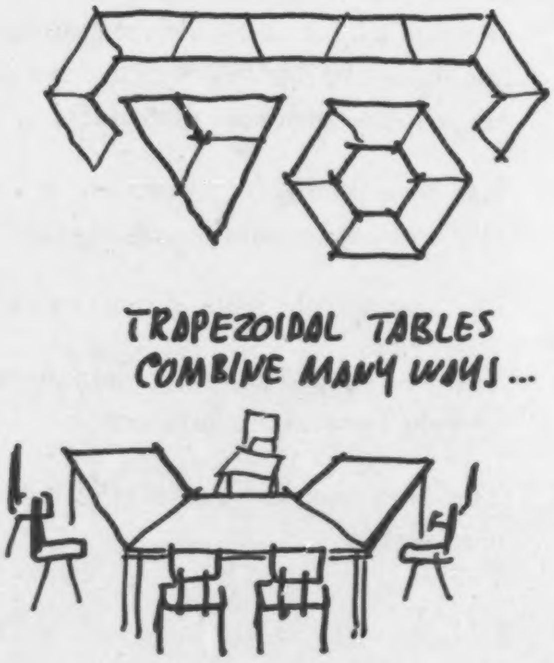

DESK WITH BOOK SHELF & SEPARATE CHAIR

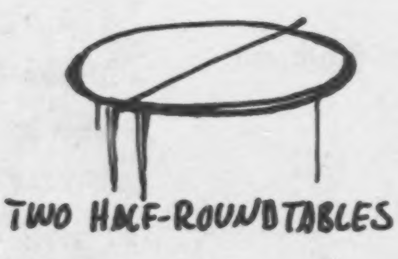

ONE-PIECE CHAIR-AND-DESK WITH BOOK BOX


FOLDING CHAIR
...WITH TABLET ARM
...UPHOLSTERED (ALSO WITH ARMS)

TYPES OF MOVABLE TABLES -

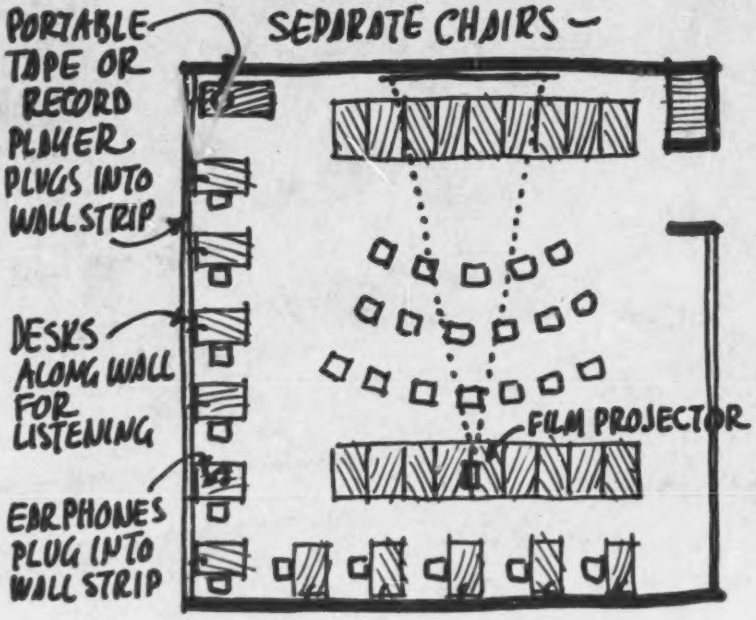

RECTANGULAR TABLES


TRAPEZOIDAL TABLES COMBINE MANY WAYS...

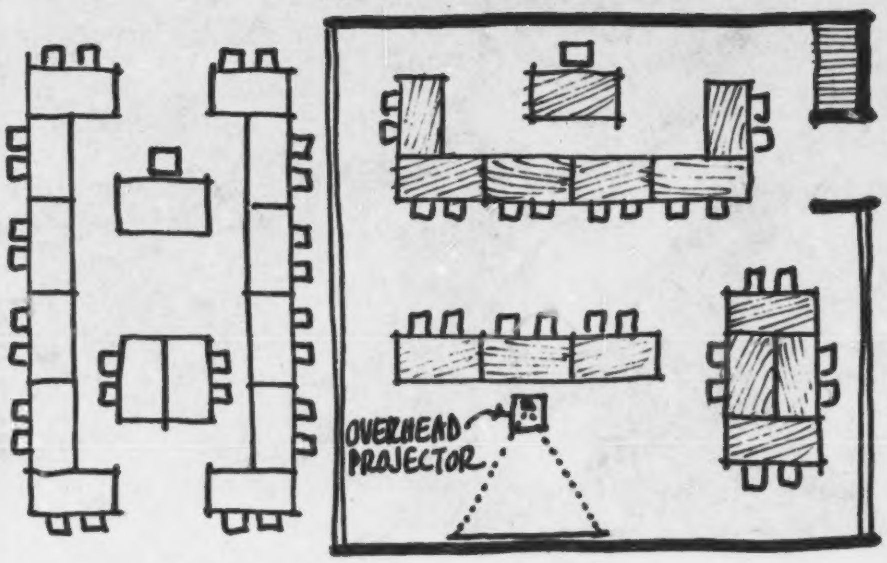

TWO HALF-ROUND TABLES

CL

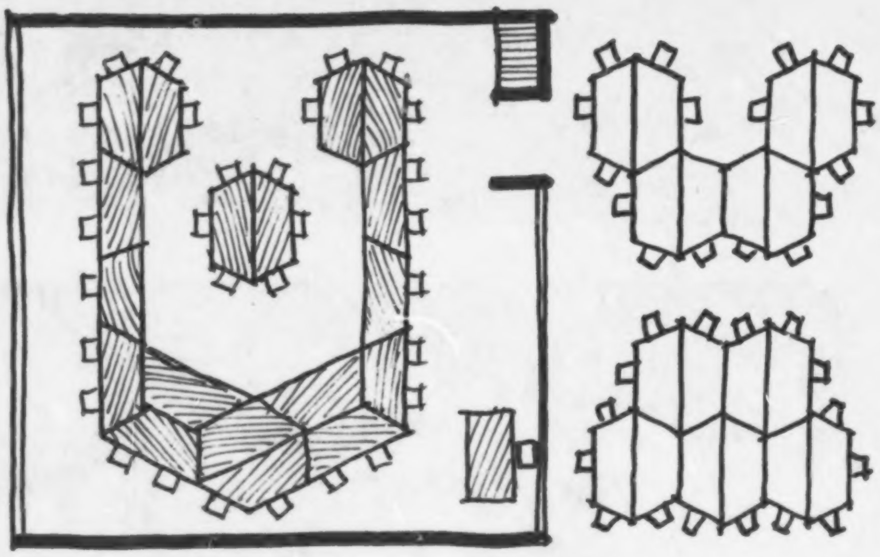
DESKS AND SEPARATE CHAIRS—


PORTABLE TAPE OR RECORD PLAYER PLUGS INTO WALL STRIP
DESKS ALONG WALL FOR LISTENING
EARPHONES PLUG INTO WALL STRIP
FILM PROJECTOR

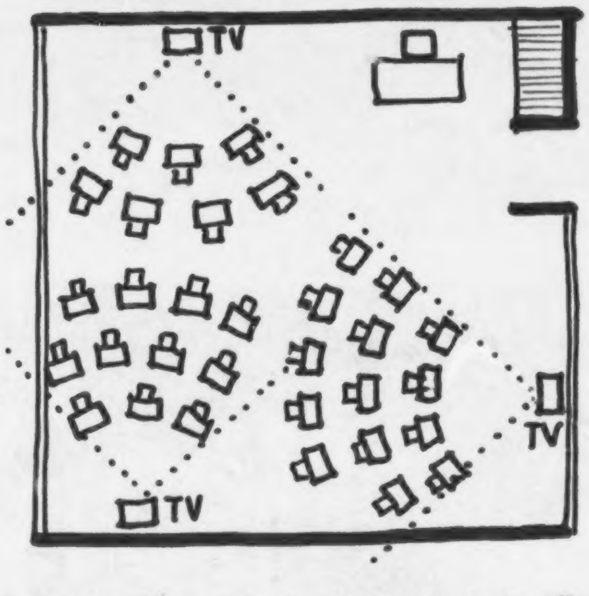
RECTANGULAR TABLES AND SEPARATE CHAIRS—


OVERHEAD PROJECTOR

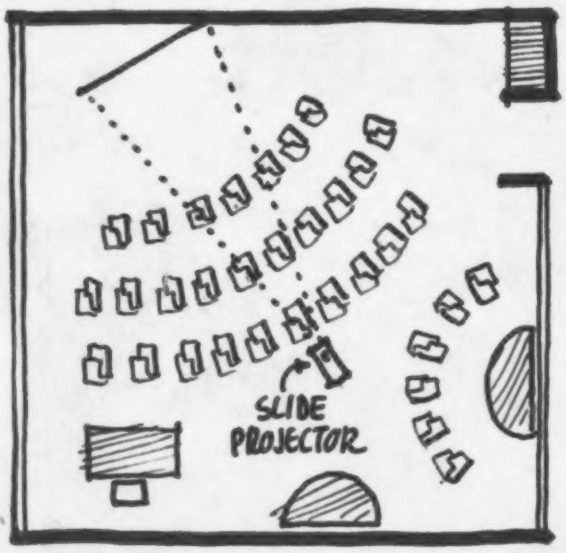
TRAPEZOIDAL TABLES—



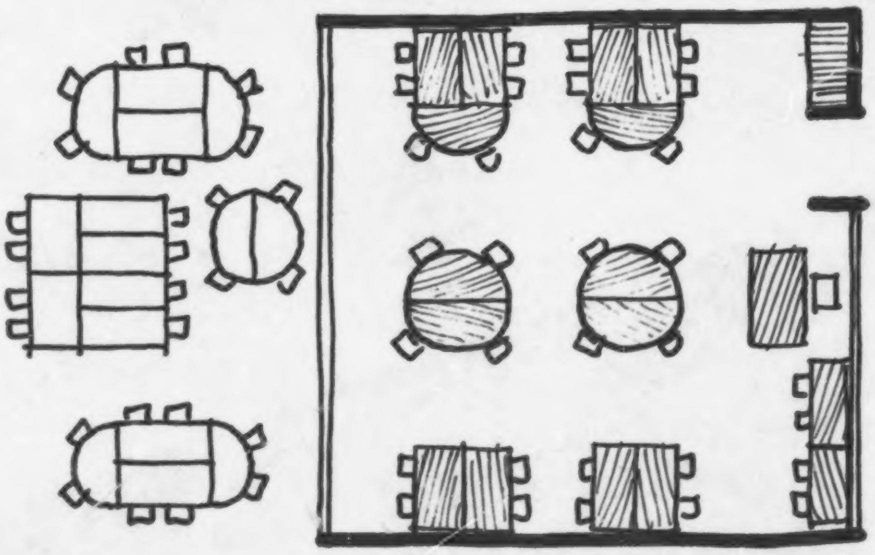
CHAIR-DESKS OR STUDY-TOPS—



TABLET ARM CHAIRS—


SLIDE PROJECTOR

HALF-ROUND AND RECTANGULAR TABLES—



9:00
9:40
9:40
10:20
10:35
11:20
11:20
12:00
1:00
1:40
1:40
2:20
2:20

CHICAGO PUBLIC SCHOOLS

LANGUAGE LABORATORIES

Functions of the language laboratory in elementary and secondary schools.

The term "language laboratory" is used to describe any one of a number of rooms and spaces in public schools and colleges where recording and playback equipment is used in the teaching of speech, literature, foreign language, and business education.

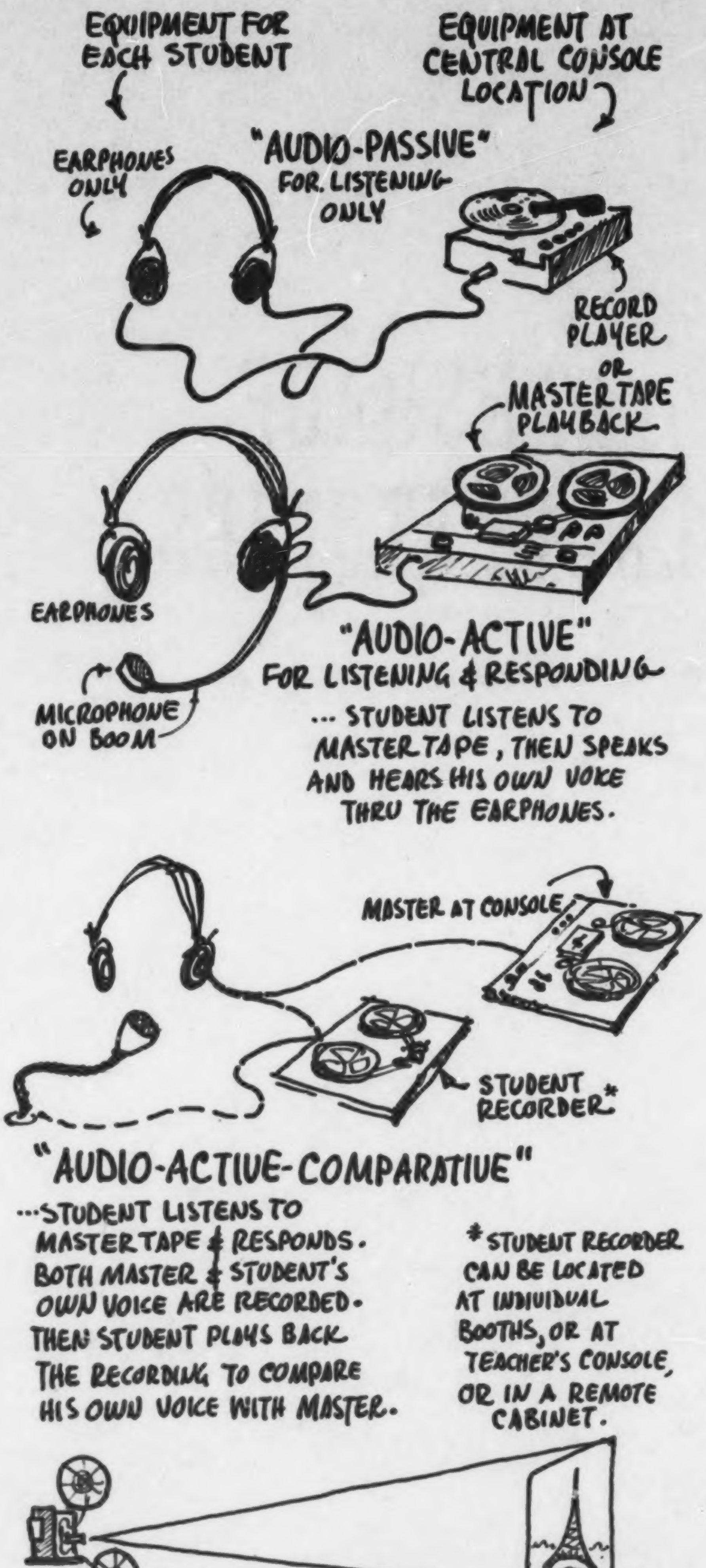
The many different uses made of this kind of equipment and the lack of fixed standards for equipping laboratories is due in part to the short history of language laboratories and in part to the current wide-scale experimentation in their use.

The laboratory idea received its impetus from World War II when the government was compelled to find ways of teaching foreign languages to members of the armed services and to civilians in a very limited time.

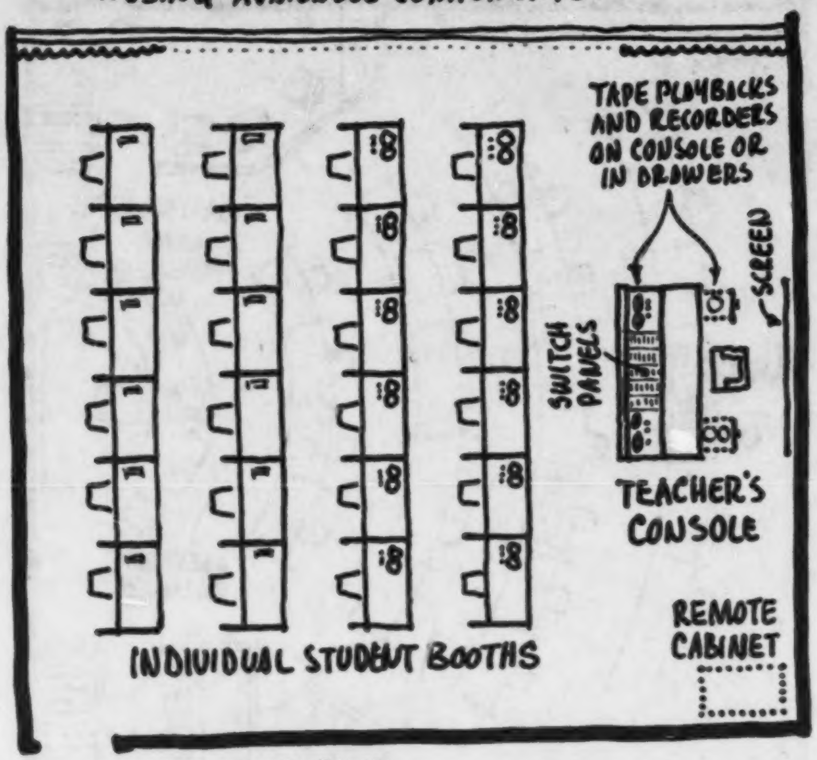
Whereas the teaching of languages in schools and universities, up to that time, had relied mainly on grammar, reading, and writing, the armed services emphasized listening and speaking to speed up the process of language acquisition. After the war, public schools and colleges began to take an interest in the spoken language, having watched with interest the successful programs of the armed services.

The purpose of the language laboratory, in whatever form it takes, is to provide opportunities for students to hear a language and to practice speaking it by responding to what they hear. Not all installations provide for even these basic purposes. Some provide only for listening. Others provide equipment that enables the student to record his responses to the master tape on his own recorder so that he may study, and with the teacher's help correct, his intonation, pronunciation, and inflection. Still other and more elaborate facilities provide for motion picture and other audio-visual materials to enrich and improve language instruction.

The suggestions presented here should in no regard be construed as restricting flexible and creative thinking regarding the language laboratory. Such possibilities as using portable labs or equipping all language rooms (including English and speech rooms) with laboratory equipment should be examined before deciding on the type of installation that will best serve the instructional program of a school. The instructional uses desired will require adaptations of the following principles and suggestions.

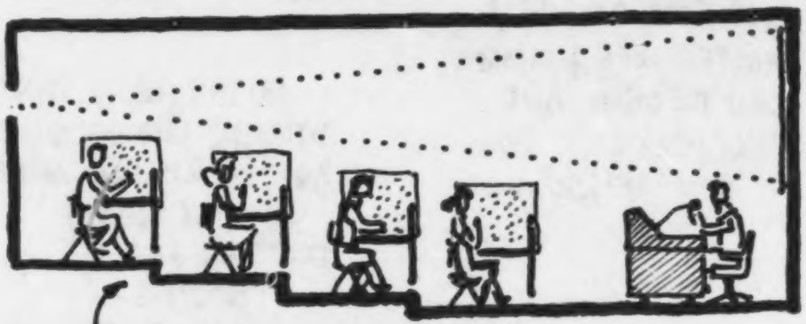

EQUIPMENT FOR EACH STUDENT
EQUIPMENT AT CENTRAL CONSOLE LOCATION
"AUDIO-PASSIVE" FOR LISTENING ONLY
EARPHONES ONLY
RECORD PLAYER OR MASTER TAPE PLAYBACK
EARPHONES
MICROPHONE ON BOOM
"AUDIO-ACTIVE" FOR LISTENING & RESPONDING
... STUDENT LISTENS TO MASTER TAPE, THEN SPEAKS AND HEARS HIS OWN VOICE THRU THE EARPHONES.
MASTER AT CONSOLE
STUDENT RECORDER*
"AUDIO-ACTIVE-COMPARATIVE"
...STUDENT LISTENS TO MASTER TAPE & RESPONDS. BOTH MASTER & STUDENT'S OWN VOICE ARE RECORDED. THEN STUDENT PLAYS BACK THE RECORDING TO COMPARE HIS OWN VOICE WITH MASTER.
* STUDENT RECORDER CAN BE LOCATED AT INDIVIDUAL BOOTHS, OR AT TEACHER'S CONSOLE, OR IN A REMOTE CABINET.
.... NEXT- ADD THE VISUAL COMPONENT

THE MOST COMMON PLAN —
...USING AVAILABLE COMPONENTS...


TAPE PLAYBACKS AND RECORDERS ON CONSOLE OR IN DRAWERS
SCREEN
SWITCH PANELS
TEACHER'S CONSOLE
REMOTE CABINET
INDIVIDUAL STUDENT BOOTHS

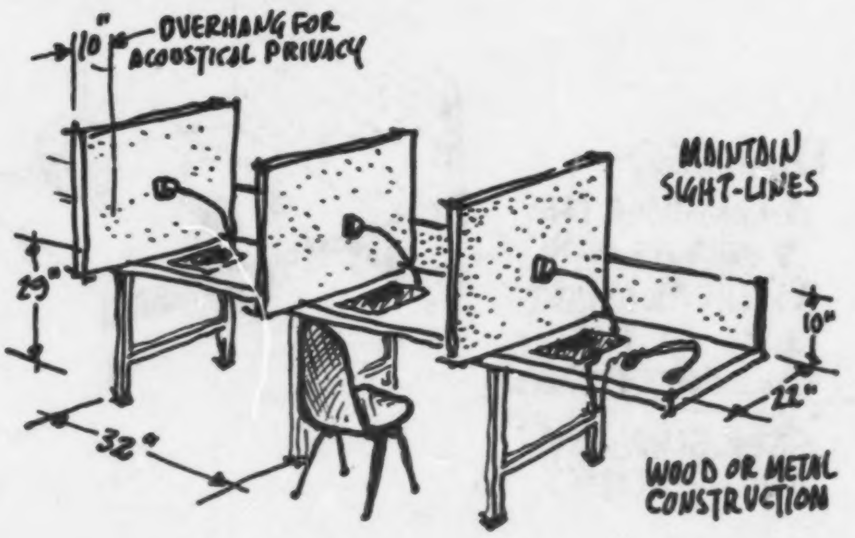
IN THE ABOVE PLAN —
- 2 BACK ROWS OF BOOTHS ARE "AUDIO-ACTIVE".
- 2 FRONT ROWS OF BOOTHS ARE "AUDIO-ACTIVE-COMPARATIVE"

(STUDENT TAPE RECORDERS ARE SHOWN IN BOOTHS BUT COULD BE LOCATED IN REMOTE CABINET.)



RISERS IMPROVE VIEW OF FRONT SCREEN

TYPICAL BOOTH DESIGN —


10"
OVERHANG FOR ACOUSTICAL PRIVACY
MAINTAIN SIGHT-LINES
29"
10"
21"
32"
WOOD OR METAL CONSTRUCTION

LAB

The number of student positions in the language laboratory will vary according to the number of foreign languages or other courses offered which utilize the laboratory; the number of students enrolled in each course; the hours of use per week per student and the largest number of language classes taught during any one period of the school day.

In planning space, consideration should be given to:

Convenient access to and from booths or tables by students.
Convenient access to all pupil stations by teacher.
Convenient access by teacher to console, and to recording studio where one is provided.

The teacher should have visual access to all rooms, compartments, and spaces in the area. Where dividers (booths) are used, "risers" have been found useful in improving visual control.

Booths should be planned so that students using them can view the front and center of the room when projectors and other teaching aids are used. Dividers should be just high enough to shut out vision of students on either side when the student is seated. The booth front should be no higher than 10-12 inches from the desk top. (Some authorities question the need for booths, stating that earphones and directional microphones make them unnecessary.)

Individual room ventilation control is especially desirable in the language laboratory, where heat is generated from a number of sources, and where a high degree of student concentration is demanded. In converting regular classrooms to language laboratories, the adequacy of ventilation should be given special attention.

Doors that close quietly and automatically are desirable but only necessary where loudspeakers are a part of the language program. Where earphones are used, such sounds are not seriously distracting.

Classroom lighting should be planned to give adequate illumination of all work surfaces including booths, consoles, and storage cabinets.

The electrical lighting system should not interfere with the sound system. Ballasts for fluorescent lighting should be of a type that will not create interference.

The electrical system of the laboratory should be isolated so that turning off lights and appliances in other parts of the building and other disturbances will not cause interference or power failure in the language laboratory.

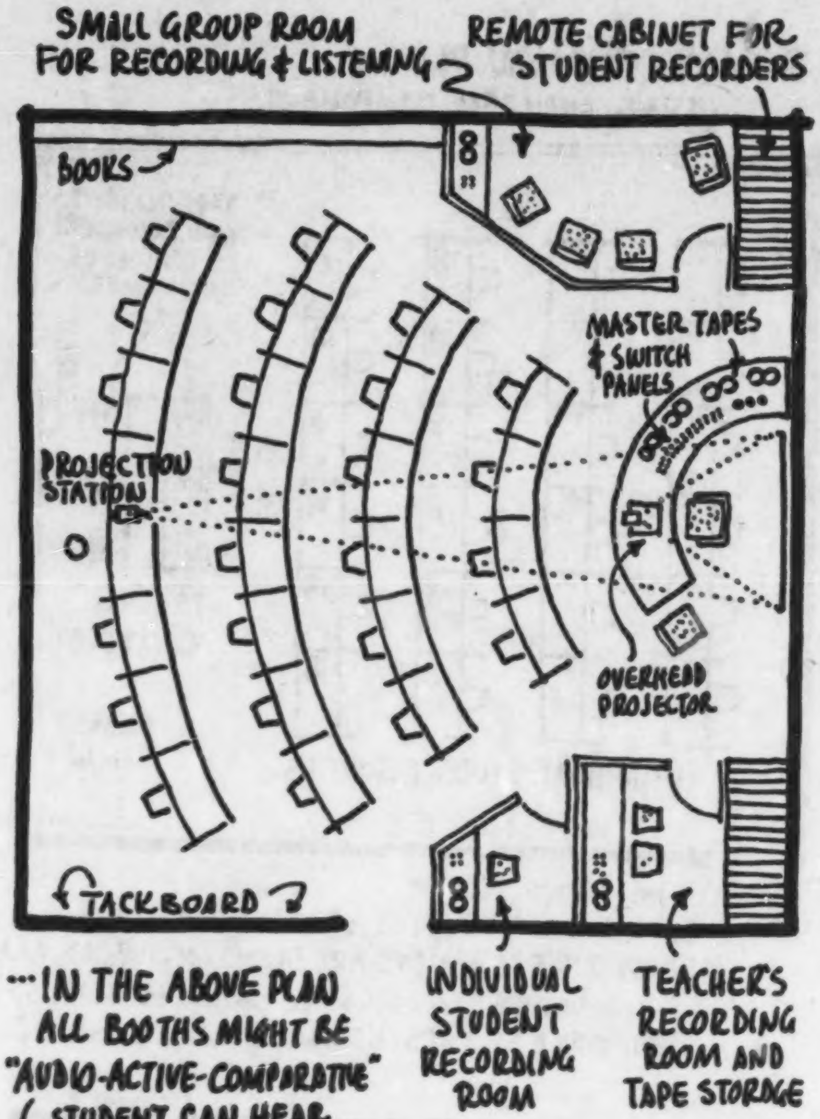
A master switch should be provided that will turn off all electricity in the laboratory except the overhead lights.

Wiring at each booth should be located and designed to minimize tampering and accidental injury to equipment and students. All electrical connections should be well concealed and protected.

Wiring should be accessible and easily alterable. Circuits and installations should be designed to permit checking and servicing with a minimum of interruption of instruction.

Both artificial and natural light control should be provided for the language room. (Suggestions for methods of light control are presented under the Classrooms chapter of this publication.)

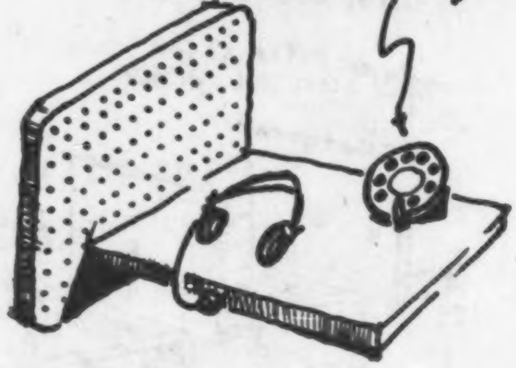
Areas for preparing (recording) tapes or records should be soundproof, and materials used in student booths, walls, ceilings, and floors, should all contribute to minimizing noise in the laboratory.


SMALL GROUP ROOM FOR RECORDING & LISTENING
REMOTE CABINET FOR STUDENT RECORDERS
BOOKS
MASTER TAPES & SWITCH PANELS
PROJECTION STATION
OVERHEAD PROJECTOR
TACKBOARD
INDIVIDUAL STUDENT RECORDING ROOM
TEACHER'S RECORDING ROOM AND TAPE STORAGE

...IN THE ABOVE PLAN ALL BOOTHS MIGHT BE "AUDIO-ACTIVE-COMPARATIVE" (STUDENT CAN HEAR MASTER TAPE & HIMSELF, CAN RECORD, AND CAN PLAYBACK FOR COMPARISON.)

... IN THE ABOVE PLAN STUDENT TAPE RECORDERS ARE IN REMOTE CABINET .. SO ONLY SIMPLE CONTROLS ARE IN BOOTHS.

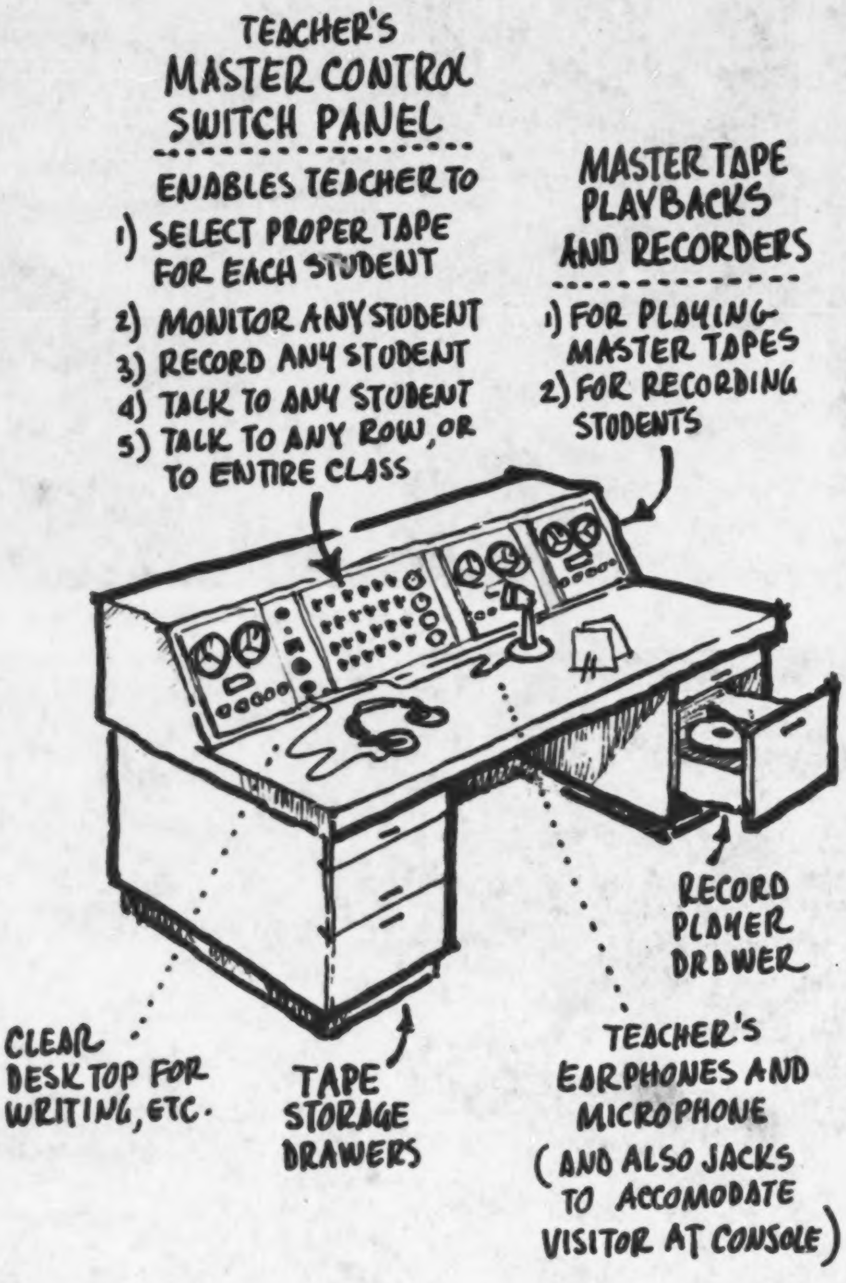
(A SIMPLE SWITCH OR DIAL GIVES STUDENT CHOICE OF CHANNELS)



REMINDER-
A LANGUAGE LAB IS ONLY AS GOOD AS THE "WEAKEST LINK" IN THE EQUIPMENT CHAIN.

SEEK SIMPLICITY AND QUALITY.

LAB


TEACHER'S MASTER CONTROL SWITCH PANEL
ENABLES TEACHER TO
1) SELECT PROPER TAPE FOR EACH STUDENT
2) MONITOR ANY STUDENT
3) RECORD ANY STUDENT
4) TALK TO ANY STUDENT
5) TALK TO ANY ROW, OR TO ENTIRE CLASS
MASTER TAPE PLAYBACKS AND RECORDERS
1) FOR PLAYING MASTER TAPES
2) FOR RECORDING STUDENTS
RECORD PLAYER DRAWER
CLEAR DESK TOP FOR WRITING, ETC.
TAPE STORAGE DRAWERS
TEACHER'S EARPHONES AND MICROPHONE
(AND ALSO JACKS TO ACCOMODATE VISITOR AT CONSOLE)

Where individual instruction is desired, both student and teacher selector controls should be provided. Lack of selector systems requires playing the same recorded materials to all listeners at the same time, thus eliminating one important value of laboratory language instruction.

When teacher monitoring is provided, the system should enable the teacher at any moment to listen to one student's master, response, or recording and to speak to the student without passing through another student's circuit.

When teacher communication with the student is provided, the teacher should be able to turn off one or several student's master without affecting the master of other students on the same master circuit.

Where teacher communication with students is desired, such communication should be possible at any time during listening, playback, or stop conditions.

When student recording is provided, the student should be able easily to adjust both his listening and recording loudness.

Disc and tape channels at the console should be connected with a room loudspeaker for group listening.

The console should be provided with a lid or cover that can be locked to prevent tampering.

Adequate storage should be provided for tapes, records, student books, equipment, cards, and spare parts. Storage for tapes and records should not be located close to any source of heat or strong magnetic field.

ABOVE: EVANSTON TWP. H. S., EVANSTON, ILLINOIS

BELOW: NIAGARA-WHEATFIELD JR.-SR. H. S, NIAGAR

AUDITORIUMS
AND
MULTI-PURPOSE ROOMS

Designing auditoriums and multi-purpose rooms for use of new educational media involves consideration of seating comfort, acoustics, lighting, room darkening, heating, ventilating, and wiring. Especially important is the matter of acoustics. An auditorium can be rewired, ventilation systems installed, and darkening facilities provided at more or less cost at any time, but acoustics, once established, are difficult to alter.

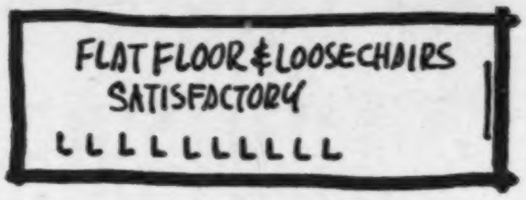
Although many of the suggestions in this section apply both to auditoriums and multi-purpose rooms, auditorium requirements chiefly have been considered.

SEATING

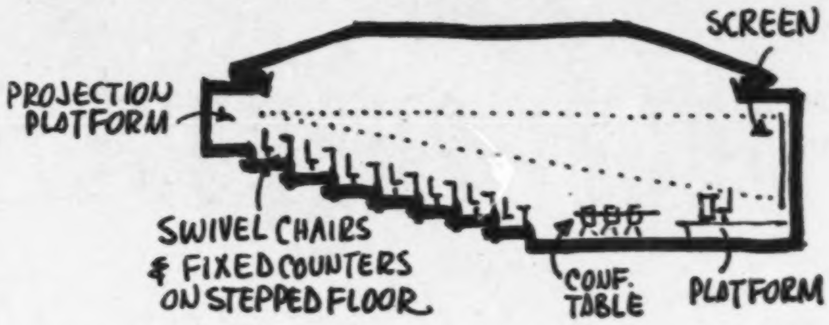
Except in very small auditoriums and in multi-purpose rooms, sufficient floor slope should be provided to insure good vision of the screen from all seats.

When permanent seating is provided, it should be staggered for maximum visibility of the screen. Seating should be comfortable, give proper posture support, and should be of durable design and construction. Raising and lowering of seats should create no noise.

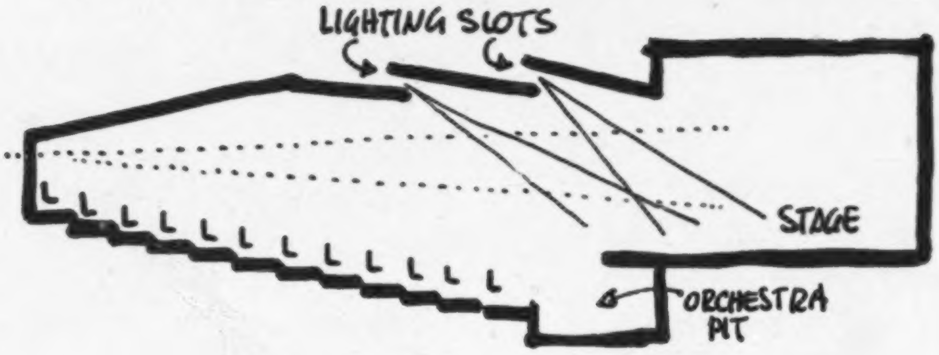
100 SEAT CLASSROOM

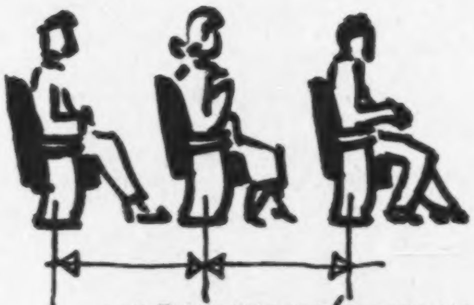

FLAT FLOOR & LOOSE CHAIRS
SATISFACTORY

200 SEAT LECTURE ROOM


SCREEN
PROJECTION PLATFORM
SWIVEL CHAIRS & FIXED COUNTERS ON STEPPED FLOOR
CONF. TABLE
PLATFORM

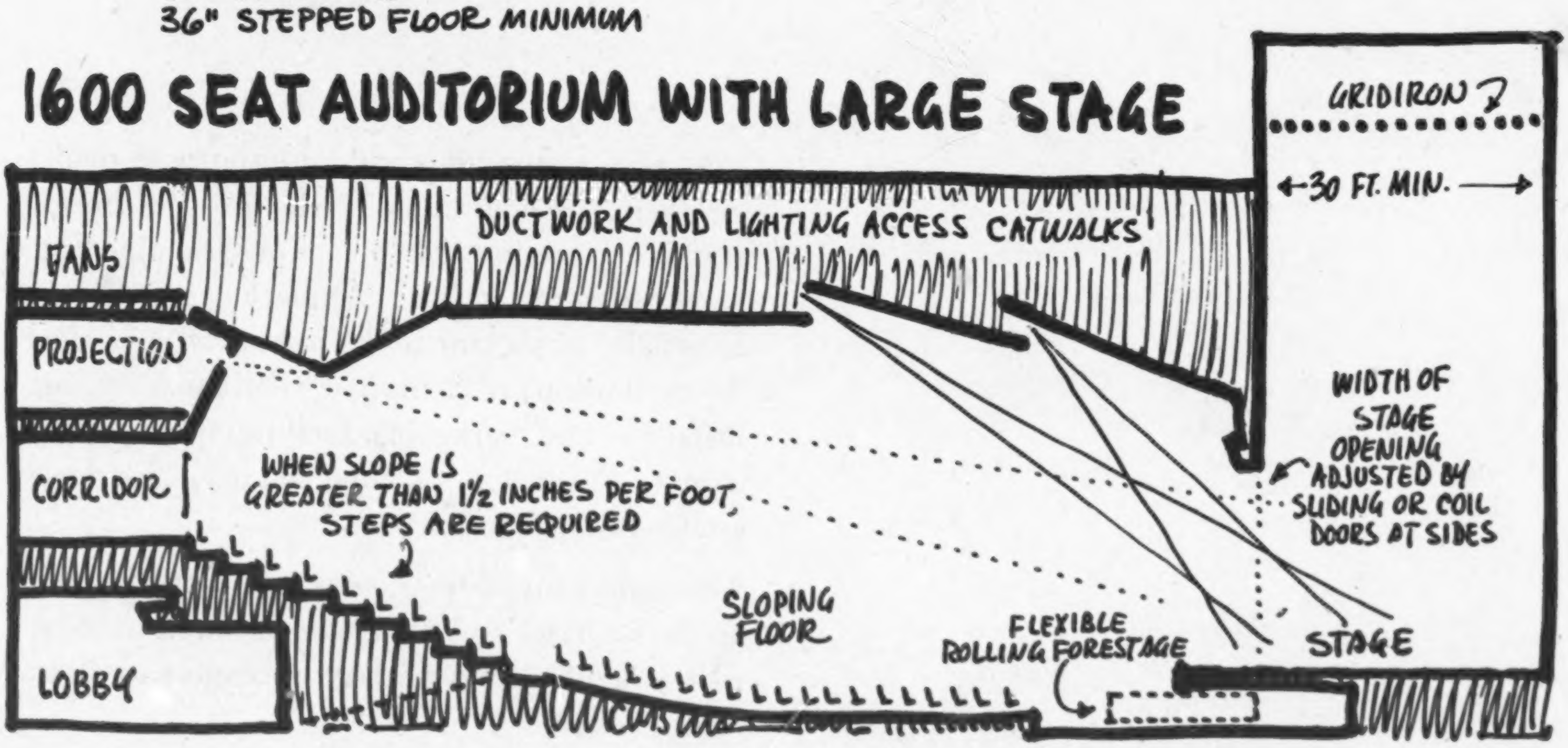
500 SEAT GENERAL AUDITORIUM


LIGHTING SLOTS
STAGE
ORCHESTRA PIT



32" MINIMUM (WOOD BACKS)
34" MINIMUM (UPHOLSTERED BACKS)
38" PREFERRED
36" STEPPED FLOOR MINIMUM

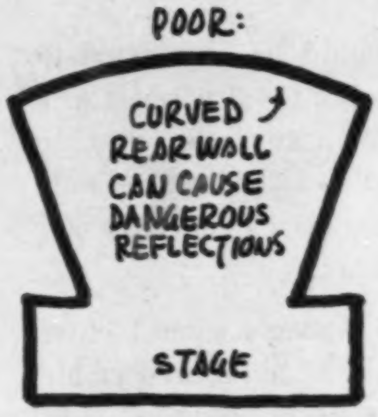
1600 SEAT AUDITORIUM WITH LARGE STAGE


GRIDIRON
30 FT. MIN.
DUCTWORK AND LIGHTING ACCESS CATWALKS
FANS
PROJECTION
CORRIDOR
WHEN SLOPE IS GREATER THAN 1½ INCHES PER FOOT, STEPS ARE REQUIRED
LOBBY
SLOPING FLOOR
FLEXIBLE ROLLING FORESTAGE
WIDTH OF STAGE OPENING ADJUSTED BY SLIDING OR COIL DOORS AT SIDES
STAGE

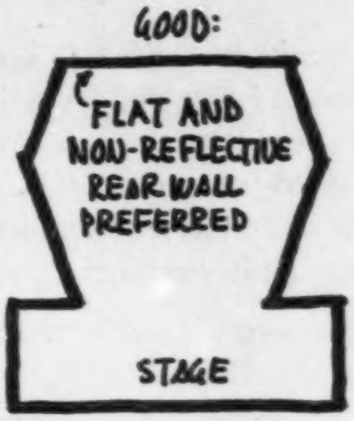
ACOUSTICS

A-MP

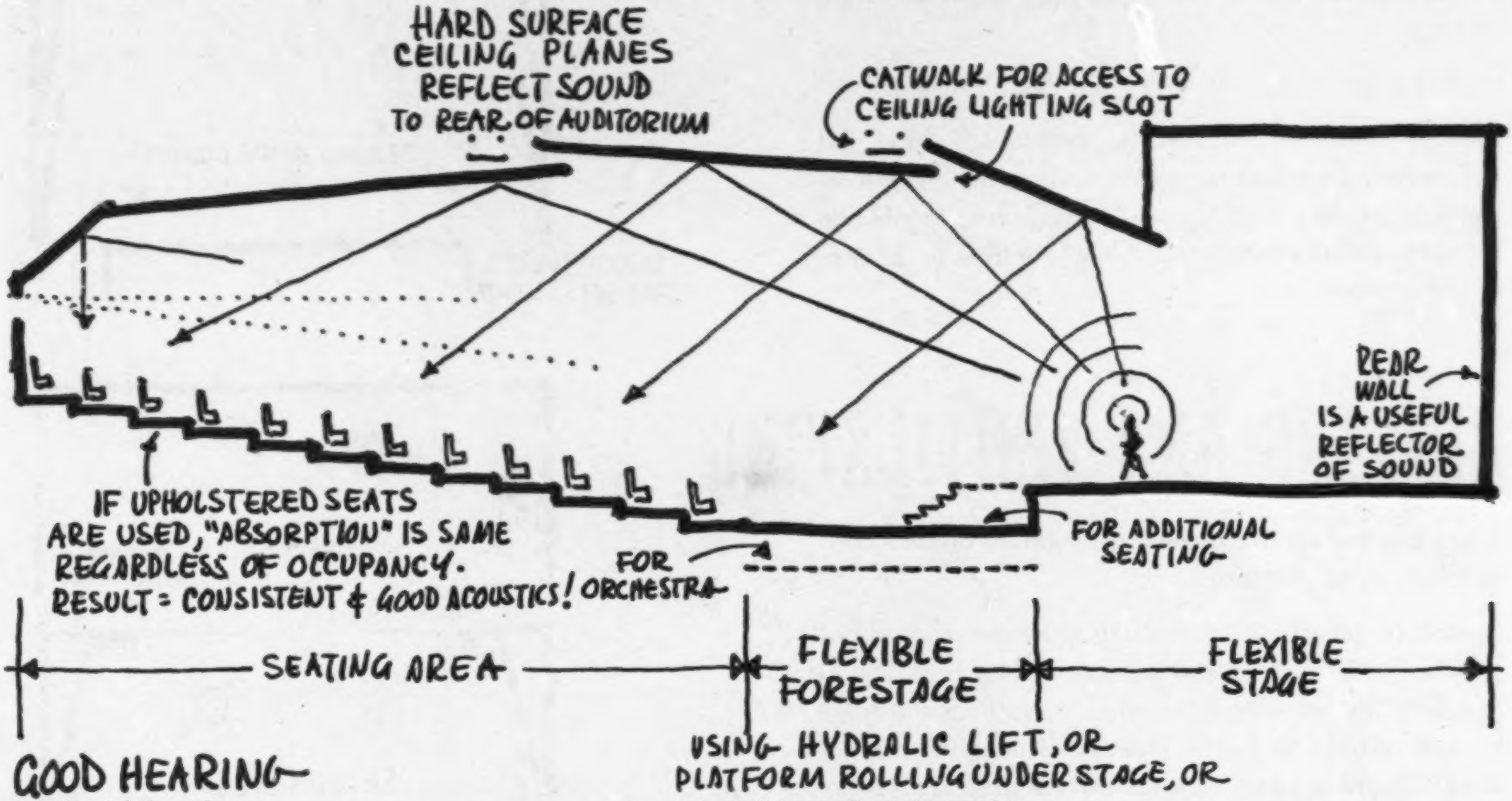
An acoustical engineer should be consulted to insure proper planning of the physical design and acoustical properties of the auditorium or multi-purpose room. Acoustical problems are complex and require the attention of expert personnel. To illustrate, under certain conditions upholstered seating may yield greater acoustical benefits than direct acoustical treatment of walls and ceiling.


POOR:
CURVED REAR WALL CAN CAUSE DANGEROUS REFLECTIONS
STAGE

COMMON AUDITORIUM PLAN

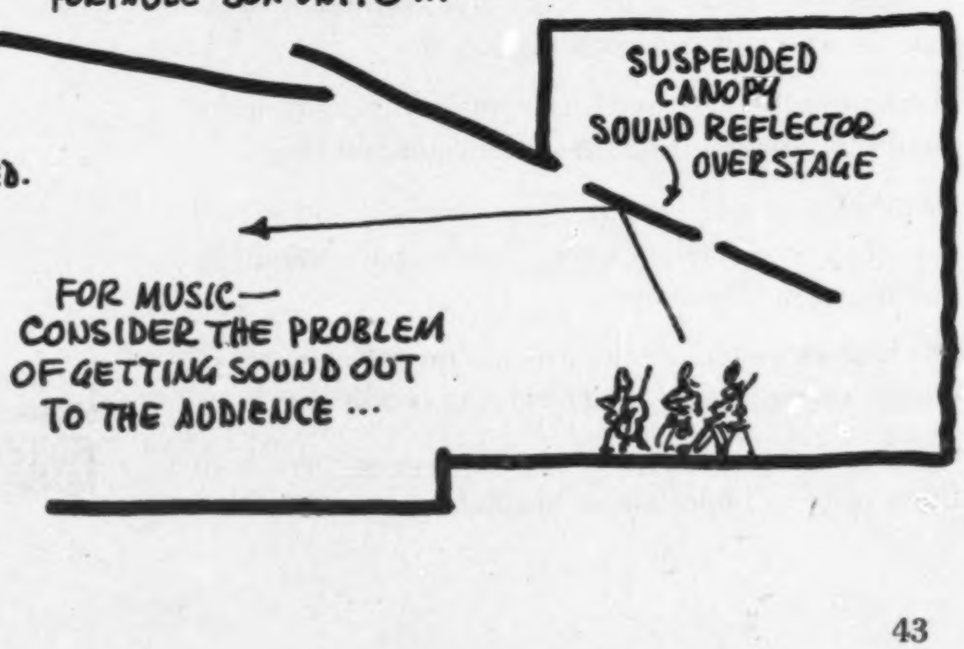

GOOD:
FLAT AND NON-REFLECTIVE REAR WALL PREFERRED
STAGE

BETTER PLAN


HARD SURFACE CEILING PLANES REFLECT SOUND TO REAR OF AUDITORIUM
CATWALK FOR ACCESS TO CEILING LIGHTING SLOT
REAR WALL IS A USEFUL REFLECTOR OF SOUND
IF UPHOLSTERED SEATS ARE USED, "ABSORPTION" IS SAME REGARDLESS OF OCCUPANCY.
RESULT = CONSISTENT & GOOD ACOUSTICS!
FOR ORCHESTRA
FOR ADDITIONAL SEATING
SEATING AREA
FLEXIBLE FORESTAGE
FLEXIBLE STAGE
USING HYDRALIC LIFT, OR PLATFORM ROLLING UNDER STAGE, OR PORTABLE BOX UNITS ...

GOOD HEARING
DEPENDS ON ....

1) KEEPING OUT UNWANTED NOISE
   FROM TRAFFIC, VENTILATION, ETC.
2) ADEQUATE LOUDNESS
   AND SOMETIMES A P.A. SYSTEM IS NEEDED.
3) GOOD DISTRIBUTION OF SOUND
   WHICH DEPENDS ON GOOD DESIGN OF CEILING PLANES AND WALLS.
4) PROPER "REVERBERATION TIME"
   WHICH IS CALCULATED BY THE ARCHITECT OR ACOUSTICAL ENGINEER AND IS CONTROLLED BY THE QUANTITY OF ABSORPTIVE MATERIAL.


SUSPENDED CANOPY SOUND REFLECTOR OVER STAGE
FOR MUSIC— CONSIDER THE PROBLEM OF GETTING SOUND OUT TO THE AUDIENCE ...

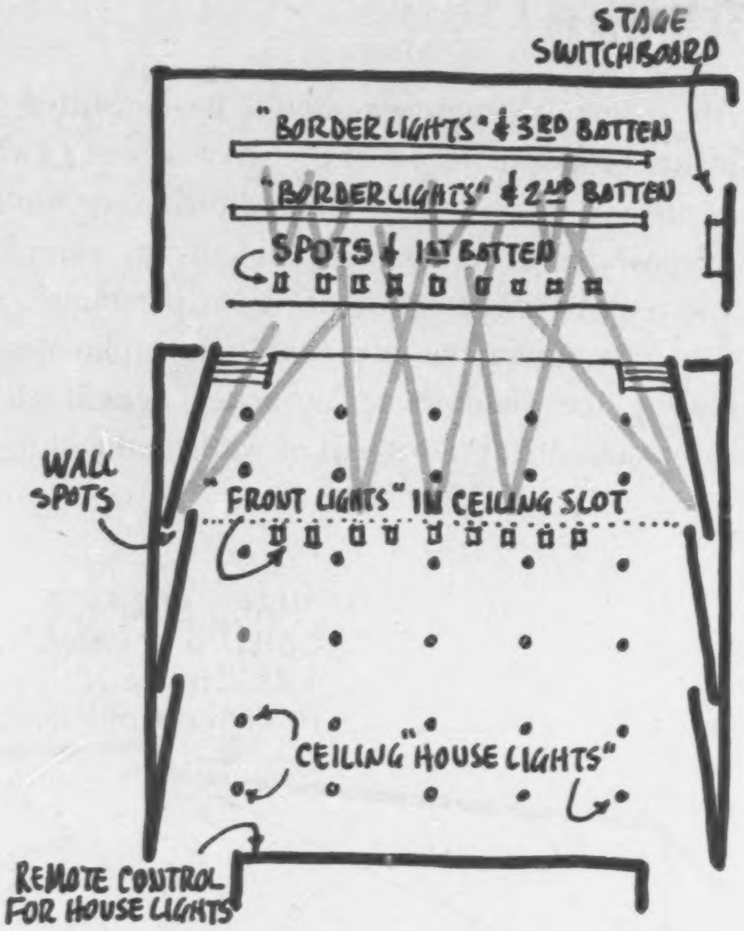
LIGHT CONTROL

Auditorium window space should be eliminated to avoid costly darkening installations and because windows serve no useful purpose in an auditorium. In multi-purpose rooms there are times when natural light is desirable, but even in these rooms a vision strip will normally serve light requirements.

Necessary window darkening systems should effectively eliminate all light leakage. Material used should be opaque, fire resistant, fade resistant, light, durable, easily manipulated, and easily cleaned. Valences and baffles should be used where necessary to prevent light leakage.

Lighting should be soft, even, and devoid of glare.

Control should be provided for artificial lighting that will permit a gradual reduction to about one-tenth foot-candle at seating level. Controls should be provided on the stage and in the projection booth or area in the rear of the auditorium.


STAGE SWITCHBOARD
"BORDER LIGHTS" & 3RD BATTEN
"BORDER LIGHTS" & 2ND BATTEN
SPOTS & 1ST BATTEN
WALL SPOTS
"FRONT LIGHTS" IN CEILING SLOT
CEILING "HOUSE LIGHTS"
REMOTE CONTROL FOR HOUSE LIGHTS

HEATING AND VENTILATING

A heating and ventilating engineer should be consulted to insure good planning.

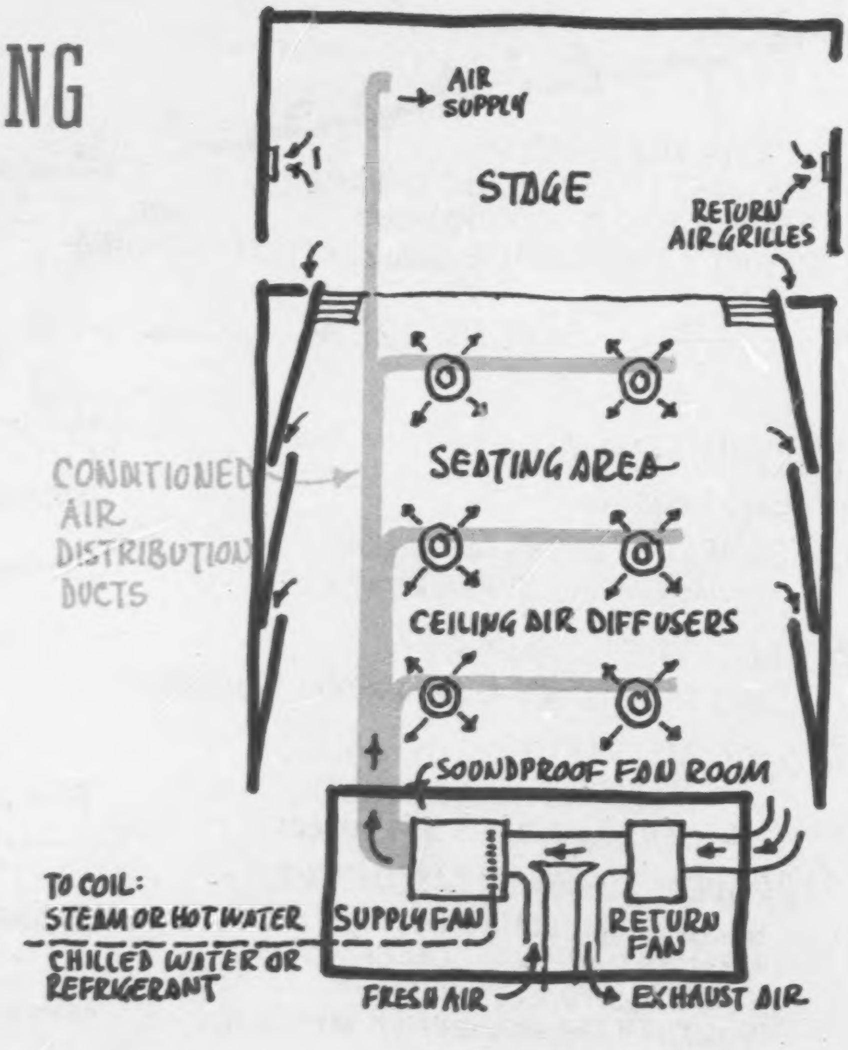
Insofar as possible, the ventilating system should not produce noise in the auditorium. It has been found that locating the ventilating equipment near the stage is more satisfactory than locating it near the rear of the auditorium, as performers will compensate for any ambient noise level in the stage area, while any noise near the rear will be competing sound.

Mechanical rooms housing ventilating equipment should be isolated from the auditorium and stage.

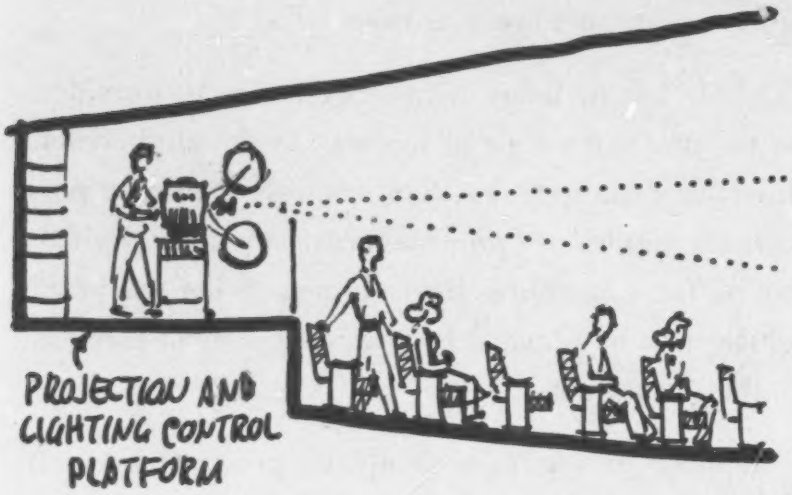
Ventilation should be entirely mechanical and should not rely upon windows since window space should be minimized or eliminated.

The heating system should provide for maintenance of uniform temperature under varying conditions.

Cooling the auditorium or multi-purpose room is at times fully as important as heating.


AIR SUPPLY
STAGE
RETURN AIR GRILLES
SEATING AREA
CONDITIONED AIR DISTRIBUTION DUCTS
CEILING AIR DIFFUSERS
SOUNDPROOF FAN ROOM
TO COIL: STEAM OR HOT WATER
CHILLED WATER OR REFRIGERANT
SUPPLY FAN
RETURN FAN
FRESH AIR
EXHAUST AIR

PROJECTION BOOTHS AND AREAS



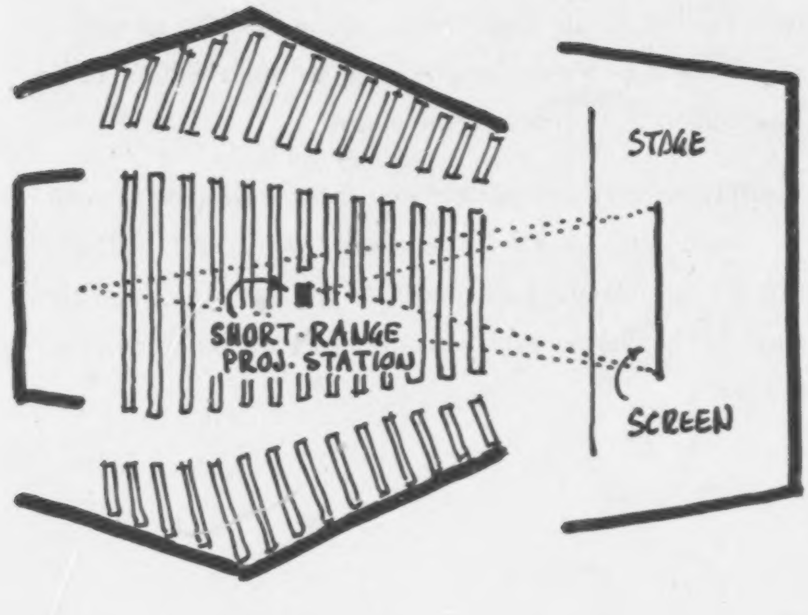
In auditoriums designed to seat 1,000 persons or more, a projection area should be provided at the rear. This area may be enclosed by glass partitions; a full booth is no longer considered necessary. Adequate storage for films, parts, and equipment should be provided in the area. In smaller auditoriums, a moderately elevated projection area should be provided with a ramp for rolling projection stands. This area may be portable to permit other uses of the space it occupies.

The projection booth should be designed so that the light beam of the projector will clear people in the auditorium whether seated or standing.

A "station" should be provided in the center of the auditorium, 15-25 feet from the screen, for the use of short-range projection equipment. This station should provide sufficient space for the convenient operation of such equipment, and should be provided a covered floor outlet.

Controls and switches in the projection area should be convenient to the projectionist.

Intercommuncation should be provided between the stage and the projection area.



SCREENS

A screen suitable for showing still and motion pictures should be provided. Motorized operation of screens is desirable. "Key" controls for raising and lowering such screens should be provided at the front and, if desired for convenience, at the rear of the auditorium.

Screen size and distance of front and back seating should be determined at the same time to establish an appropriate ratio between size of screen and distance of seating from screen. Normally the front row of seating should be about two screen widths from the screen and the back row about six screen widths from the screen. For wide screens this same rule of thumb applies except that the width of the screen should be doubled after calculating seat distances on the basis of a normal size screen.

The ceiling and (or) proscenium arch should be high enough to accommodate a screen suitably large for the size of the auditorium.

ELECTRICAL REQUIREMENTS

Double electrical outlets fed by multiple circuits independent of the house lights and fused for 30 amperes should be placed:

> Every six feet along the base at the front of the stage.
>
> At least two in each wing of the stage.
>
> Two at the back of the auditorium and one halfway back, or one one-third and another two-thirds of the way back in larger auditoriums. (See also Projection Booths and Areas, page 45.)
>
> Four in the projection booth or, in smaller auditoriums, two in the elevated projection area.

Speakers should be wired with inputs so they may be fed by the central sound system, public address, motion picture projector, record player, and tape recorder player without using long connecting cords.

Inputs for sound transmission should be placed beside all power outlets for projection and sound equipment. These inputs should connect with speaker cables leading to an amplifier and from there to the permanent speakers.

In one wing of the stage, a booth or cage should be provided to house controls for the central sound or television systems, the public address system, and recording equipment. Controls for the curtain, screen, and lights should be provided in the same area, possibly in the same booth or cage.

Controls for the house lights should also be provided in the projection area at the rear of the auditorium. In smaller auditoriums, light controls should be provided at the elevated projector area. (A portable switchboard for controlling lights is now being marketed which may be plugged in at any convenient location in the auditorium.)

Telephone or intercom should be provided between the stage control center and the projection booth, dressing rooms, choral room, band room, and properties room.

Permanent shielded cables for low impedance microphones should be installed at approximately ten-foot intervals across the front of the stage. One should also be installed at the back center of the stage, and provision should be made for an overhead microphone to be lowered to the center of the stage.

Similar microphone inputs may be installed at the center front and back of the auditorium, and halfway (small auditorium) or one-third and two-thirds of the way back (large auditorium) for audience participation.

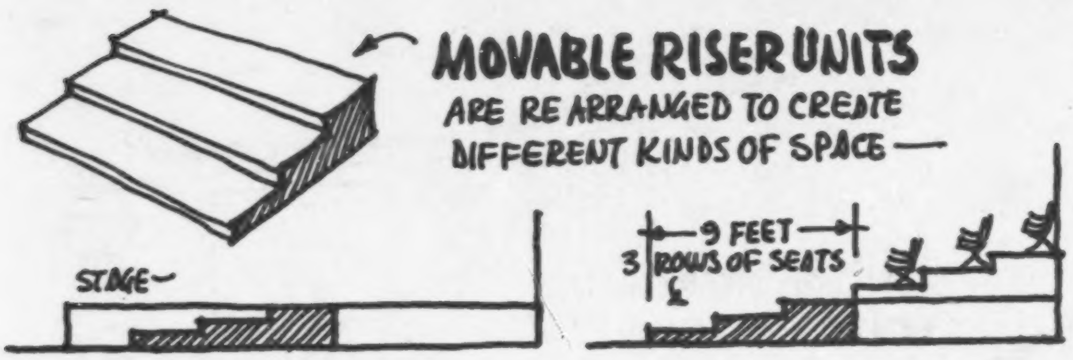
TELEVISION

Conduits leading to appropriate listening stations in the school building should be installed to permit origination of closed-circuit television programs from the auditorium stage.

A coaxial television line connecting with the closed-circuit studio (if any) should be installed and connected to at least three access points on the auditorium stage. Circuiting should be planned to permit use of the auditorium for large-group viewing of programs originating elsewhere. Lines should be easily accessible for repairs or alteration.

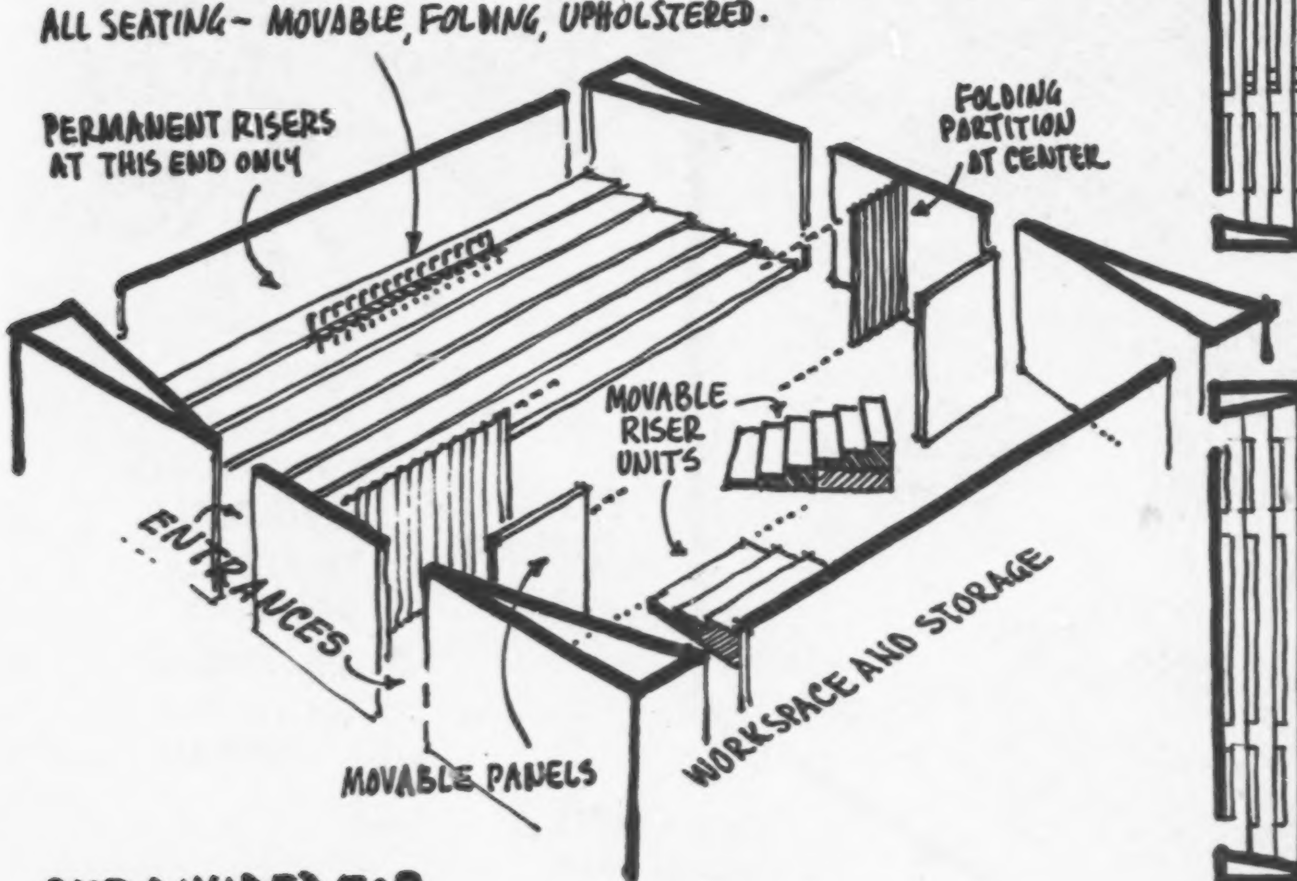
A MULTI-PURPOSE ROOM

A-MP



MOVABLE RISER UNITS ARE REARRANGED TO CREATE DIFFERENT KINDS OF SPACE—

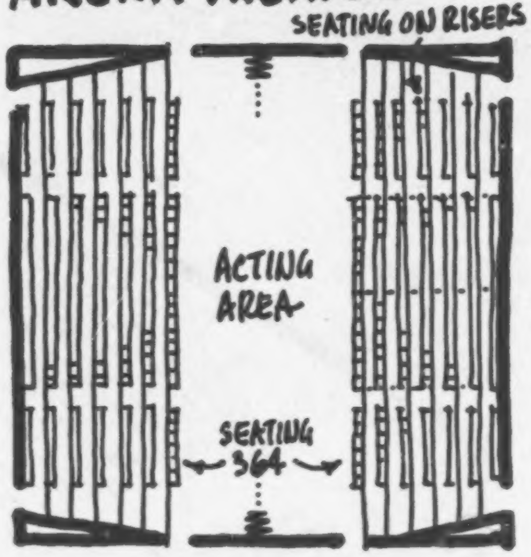
STAGE-
9 FEET
3 ROWS OF SEATS



ALL SEATING - MOVABLE, FOLDING, UPHOLSTERED.
PERMANENT RISERS AT THIS END ONLY
FOLDING PARTITION AT CENTER
MOVABLE RISER UNITS
ENTRANCES
MOVABLE PANELS
WORKSPACE AND STORAGE

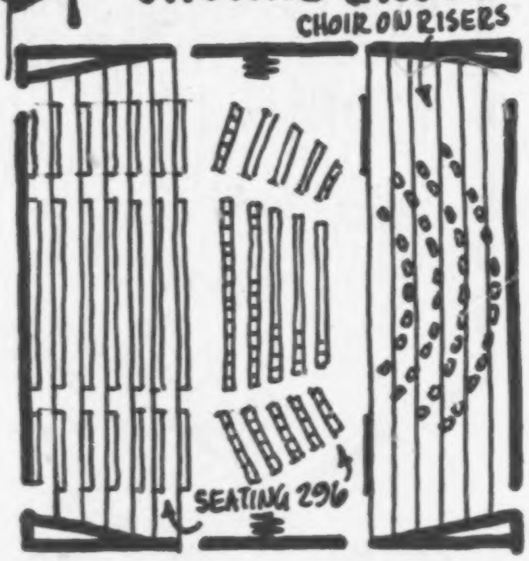
60 FEET SQUARE

ARENA THEATER-



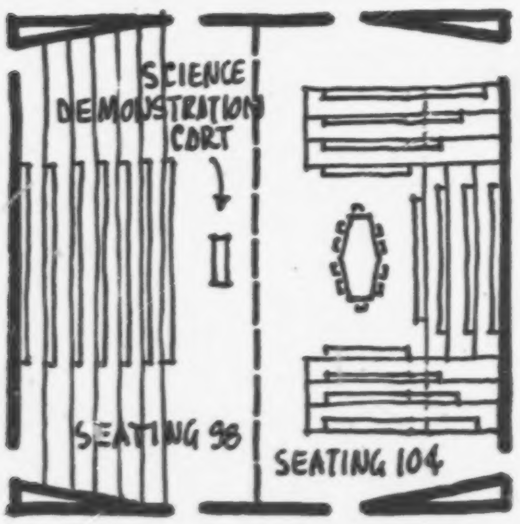
SEATING ON RISERS
ACTING AREA
SEATING 364

CHORAL GROUP-



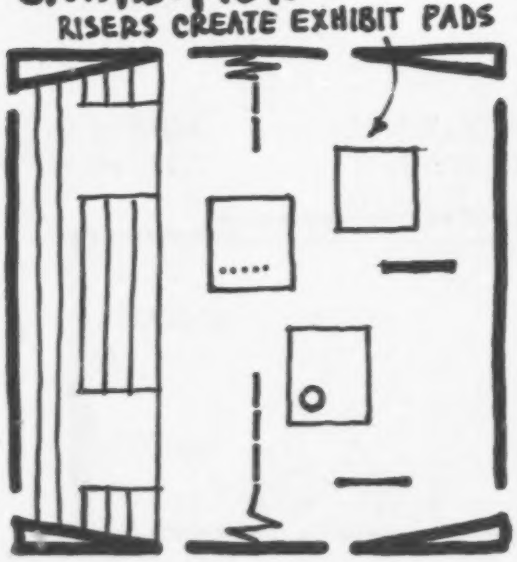
CHOIR ON RISERS
SEATING 296

SUB-DIVIDED FOR LARGE CLASSES-



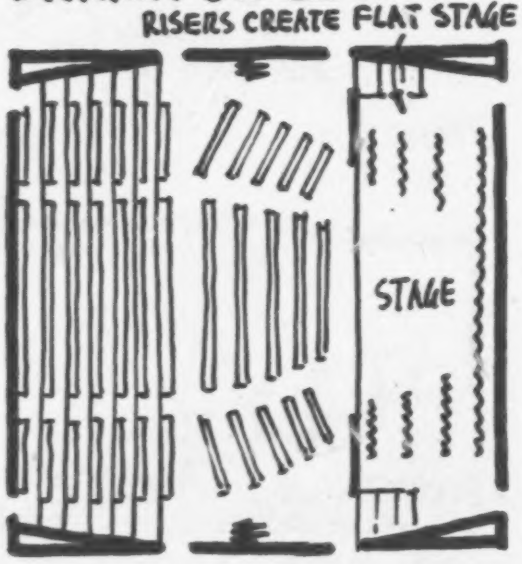
SCIENCE DEMONSTRATION CART
SEATING 98
SEATING 104

EXHIBITION-



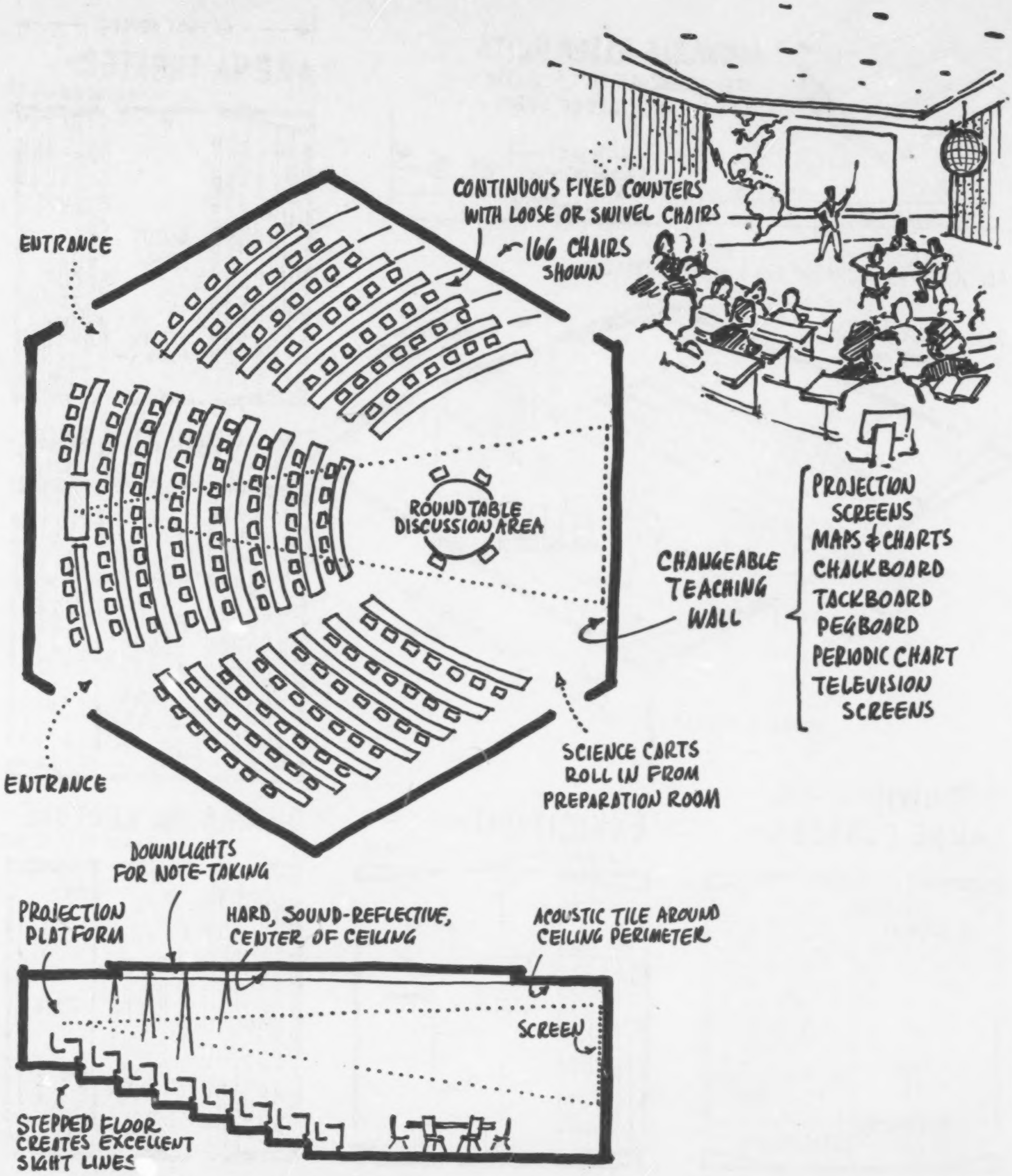
RISERS CREATE EXHIBIT PADS

DRAMA OR LECTURE-

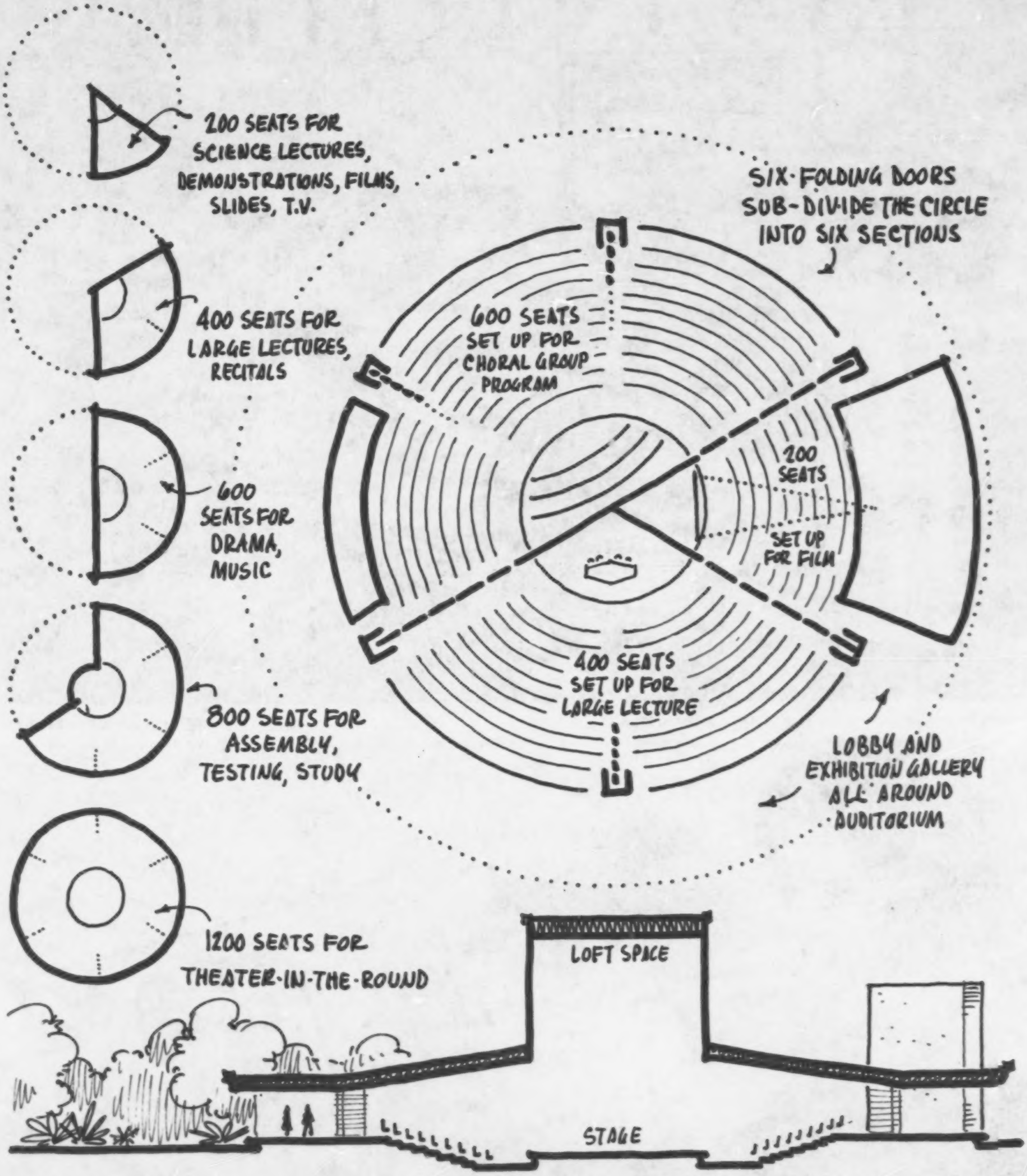


RISERS CREATE FLAT STAGE
STAGE

A TEACHING AUDITORIUM


CONTINUOUS FIXED COUNTERS WITH LOOSE OR SWIVEL CHAIRS
166 CHAIRS SHOWN
ENTRANCE
ROUND TABLE DISCUSSION AREA
CHANGEABLE TEACHING WALL
PROJECTION SCREENS
MAPS & CHARTS
CHALKBOARD
TACKBOARD
PEGBOARD
PERIODIC CHART
TELEVISION SCREENS
ENTRANCE
SCIENCE CARTS ROLL IN FROM PREPARATION ROOM
DOWNLIGHTS FOR NOTE-TAKING
PROJECTION PLATFORM
HARD, SOUND-REFLECTIVE, CENTER OF CEILING
ACOUSTIC TILE AROUND CEILING PERIMETER
SCREEN
STEPPED FLOOR CREATES EXCELLENT SIGHT LINES

A FLEXIBLE AUDITORIUM


200 SEATS FOR SCIENCE LECTURES, DEMONSTRATIONS, FILMS, SLIDES, T.V.
400 SEATS FOR LARGE LECTURES, RECITALS
600 SEATS FOR DRAMA, MUSIC
800 SEATS FOR ASSEMBLY, TESTING, STUDY
1200 SEATS FOR THEATER-IN-THE-ROUND
SIX-FOLDING DOORS SUB-DIVIDE THE CIRCLE INTO SIX SECTIONS
600 SEATS SET UP FOR CHORAL GROUP PROGRAM
200 SEATS
SET UP FOR FILM
400 SEATS SET UP FOR LARGE LECTURE
LOBBY AND EXHIBITION GALLERY ALL AROUND AUDITORIUM
LOFT SPACE
STAGE

LEFT ORLEANS

▲ KEOKUK HIGH SCHOOL AND COMMUNITY COLLEGE, KEOKUK, IOWA

▼ PORTLAND, OREGON, PUBLIC SCHOOL

INTERCOMMUNICATIONS SYSTEMS

An "intercom" system in a school can make unusual and valuable contributions to the educational program, if properly planned and resourcefully used.

It can provide for radio or recorded programs to be broadcast to one or more rooms, for student performances from various points of origin to be carried throughout the school, and even for television transmission (with talk back when needed). Communication among the staff and between the administration and staff, operation of clock and programming systems, fire and theft detection, and even instruction of the home-bound are other possible uses of the "intercom" system.

In planning, the first step is to define the functions desired; then the system which most efficiently and economically performs these functions should be selected. Following are suggestions for planning a school intercommunciations system.

The location of the console should be determined with reference to both its administrative and educational uses.

If the console is located in the principal's office (this is not recommended), it should be isolated in a soundproof area to avoid distracting the administrator.

A four-speed record player, AM and FM radio with outside antenna, and a tape recorder, all of high fidelity quality, should be provided at the central sound source. A record player and tape recorder may also be desirable at other points of program origination.

Telephone rather than loudspeaking message intercommuncation is recommended. Advantages: ability to communicate between rooms; privacy; ease of initiating communication. "Annunciator" signal lamps to identify calling room should be provided at the control console whether telephone or loudspeaker intercommunication is provided.

Microphone inputs should be provided at every planned place of program origination. Principal's office, central administrative office, gymnasium, auditorium stage, library, drama and music rooms, language laboratories, radio and TV studios (if any), and classrooms should be considered as possible sources of educational programs.

Use of a directional microphone will help prevent "acoustic feedback" which sets up a steady whistle or howl in the system.

The components of the intercom system should, insofar as possible, be standardized to permit flexible use and expansion of the system as needed.

Audio power requirements will vary with ambient (environmental) noise level, reverberation time, placement and number of seats, type of speakers selected, and quality of sound reproduction desired.

Separate sound systems or added amplifying units should be considered for such large areas as the auditorium, gymnasium, and athletic fields if the output power demands or input facilities of the central system are over-taxed. Such separate systems should be tied in with the central system so programs from the central system will be available in any special area so equipped, and so programs originating in such special areas may be carried to the rest of the school.

Classroom speakers should be located so as not to interfere with hanging of maps, charts, or screens. They should be placed to avoid echoes from opposite wall. In large rooms two or more speakers should be used to give adequate coverage.

Reproducers in the central sound system should have grills to diffuse higher frequencies.

Recessed central sound speakers in classrooms have been found to produce undue noise in adjacent rooms and should be avoided where this possibility exists.

INTER-COM

Auditorium stage speakers should be located to give illusion that sound is coming from the stage. One or two speakers placed over the proscenium arch, or speakers located on either side of the arch should accomplish this. Height of the speaker should insure good coverage. To cover both an auditorium main floor and balcony, a combination of speakers above and to either side of the proscenium should be provided.

Speaker enclosures should be of proper size and shape to insure good quality sound production. A heavy, absorbent lining should be used inside enclosures to reduce wall-to-wall reflections.

The problem, occasionally encountered, of sound "shadow" under balconies may be approached either through (1) placing some of the main speakers low to throw sound under the balcony, or (2) by placing supplementary high frequency "tweeter" speakers in the ceiling under the balcony.

Gym area speakers should be selected to fit anticipated uses. A horn speaker provides good voice articulation, and is efficient where noise is to be overcome. Cone speakers are not as effective for these uses, but are better for quality reproduction of music.

In gymnasiums, because of inherently poor acoustics, it is desirable to locate speakers so that sound is directed toward the audience and not toward walls and floors. This will increase the ratio of direct to reflected tones reaching the audience. Where reverberation is extreme, a solution is to provide numerous speakers operating at a low level.

For hallways and other long, narrow spaces, two-way housing for speakers permitting radiation of sound in opposite directions is desirable. This arrangement makes it possible to reduce the number of housings and speakers.

Weatherproof horn speakers are recommended for outdoor uses (playgrounds and stadiums).

All raceways should be accessible and should be over-size to permit alterations and additions to wiring system. Raceways should be designed to include all components of the school's intercommunications system, present and anticipated.

Sound system wiring must always be kept at least six inches away from power wiring to avoid sound pick-up. When circuits must be parallel, sound system and power wiring should be at least two feet apart.

Avoid putting circuits of different volume levels in the same conduit or cable. If this is done it may result in "cross-talk." Suggested circuit groups:

Input circuits (microphone and phonograph)

Program circuits (wire lines from remote locations)

Output circuits (speaker lines)

Architectural planning requires consideration to such non-instructional adaptations of the intercom systems as fire and theft warning systems, clock and scheduling system, and emergency warning signals, which may economically be made a part of the intercommunications system. Consideration may also be given to a school-to-home intercommunication system for instruction of the home-bound, presently in the experimetal stage.

CHICAGO PUBLIC SCHOOLS

RADIO FACILITIES

With educational TV commanding the attention of educators, interest in educational radio appears to have waned. Nonetheless, many school systems continue to maintain radio stations and are using radio effectively to supplement their programs of instruction.

As is true of audio-visual media generally, radio is most effective where its programs are appropriately co-ordinated with classroom instruction. Careful planning and programming are necessary to accomplish this. As in the case of television, educational planning should be worked out well in advance of the planning of physical needs, and should be based on a philosophy of use that is defensible from the standpoint of instruction and of economy.

It should be noted that the type of installation considered in this chapter is a school system broadcasting studio. For in-school broadcasting, suggestions will be found in the chapters on intercommuncations systems and the instructional materials center. School radio facilities will of course be simpler than the installation described in this chapter.

The school system radio station should have the following spaces:

Studio broadcasting room. Space to house piano, desk, and chairs to seat two to eight persons. Area and equipment of studio will depend upon types of programs planned.

Control room. Space to house control console, a minimum of two turntables, two tape players, a record storage rack, an "equipment (monitor) rack," a utility table, large record and tape storage cabinet, and a swivel chair for the person manning the console. Where the control room is separated from, but adjoining the studio, the wall joining the control room and studio should be soundproof and have a glass panel through which the control operator can view the studio and be seen from it.

Work and storage area. Space for making minor equipment repairs and for storing parts. Space for this purpose can be provided in the control room in small stations.

THE STUDIO

Following are suggestions for planning each of the three areas just described. The studio broadcasting room should:

Be separated from hall and outside noises by another room or by a sound lock.

Have a generally rectangular shape, avoiding even dimensions such as one to one, one to two, etc. Such dimensions produce exaggerated room resonance effects.

Be planned to avoid placing large plane, sound-reflecting surfaces opposite and parallel to each other. Such surfaces cause multiple echo or "flutter" which is picked up by microphones. When such surfaces must exist, drapes or acoustical treatment may be used to eliminate this effect.

Have floor and floor covering that will minimize noise.

Where shape of studio is rectangular, and no sound diffusing elements were used, acoustical treatment should be about equally applied on all walls and ceiling. Treatment of ceiling alone leaves other surfaces highly reflective and may set up the "flutter" effect mentioned above. Minor surfaces and coves need not be acoustically treated; they will not affect the sound qualities of a studio room significantly.

Changing the absorptive qualities of the studio for different types of programs may be desirable. Drapes may be used to do this.

Heating and ventilating systems should be non-noise producing. Methods of noise control include absorbent lined ducts laid out to form long paths between rooms, silent types of grills, and low air velocities.

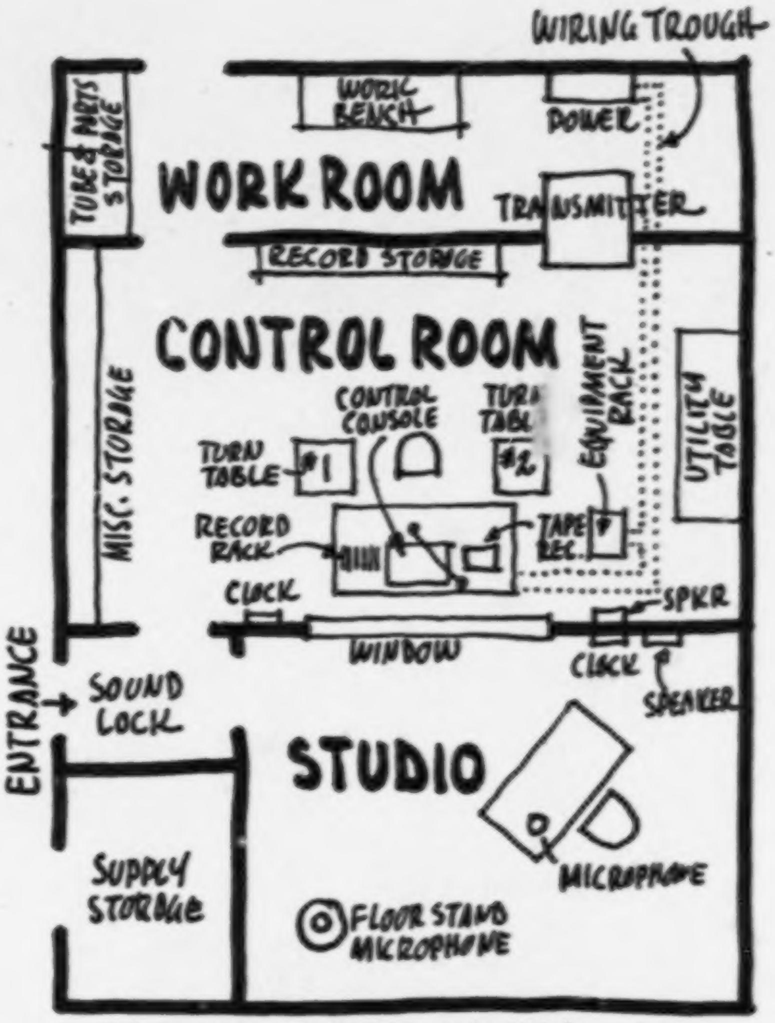
Thin acoustical materials applied directly to a rigid backing normally do not have the required absorptive qualities for a studio. An acoustical engineer should be consulted regarding the structural requirements for acceptable acoustics.

Have adequate supply storage nearby.

Be provided inputs for at least four microphones. Most consoles have provision for four or more; it is advisable to provide for more inputs than will initially be needed.

Be provided with double electrical outlets on each wall.

Be provided basic equipment including clock, monitor speaker, table microphone, at least one microphone on suspension boom or floor stand, small table, and minimum of two chairs.


WIRING TROUGH
WORK BENCH
POWER
TUBE & PARTS STORAGE
WORK ROOM
TRANSMITTER
RECORD STORAGE
CONTROL ROOM
MISC. STORAGE
CONTROL CONSOLE
TUR TABL
EQUIPMENT RACK
UTILITY TABLE
TURN TABLE
#1
#2
RECORD RACK
TAPE REC.
CLOCK
SPKR
WINDOW
CLOCK
SPEAKER
ENTRANCE
SOUND LOCK
STUDIO
MICROPHONE
SUPPLY STORAGE
FLOOR STAND MICROPHONE

PLAN RECOMMENDED BY RCA

RADIO

THE CONTROL ROOM

The control room or area should:

Be planned so that turntables, tape machines, control console, and record rack are all within easy reach of the operator.

Have the equipment rack located with reference to the control console so that frequency and modulation monitor meters may be read without leaving the operating position.

Have a large clock with sweep-second hand mounted on the wall behind the console so that operator can see it while announcing.

Have record storage racks conveniently accessible to the operator. A small utility storage rack may be located just to the rear of the operator for daily program material.

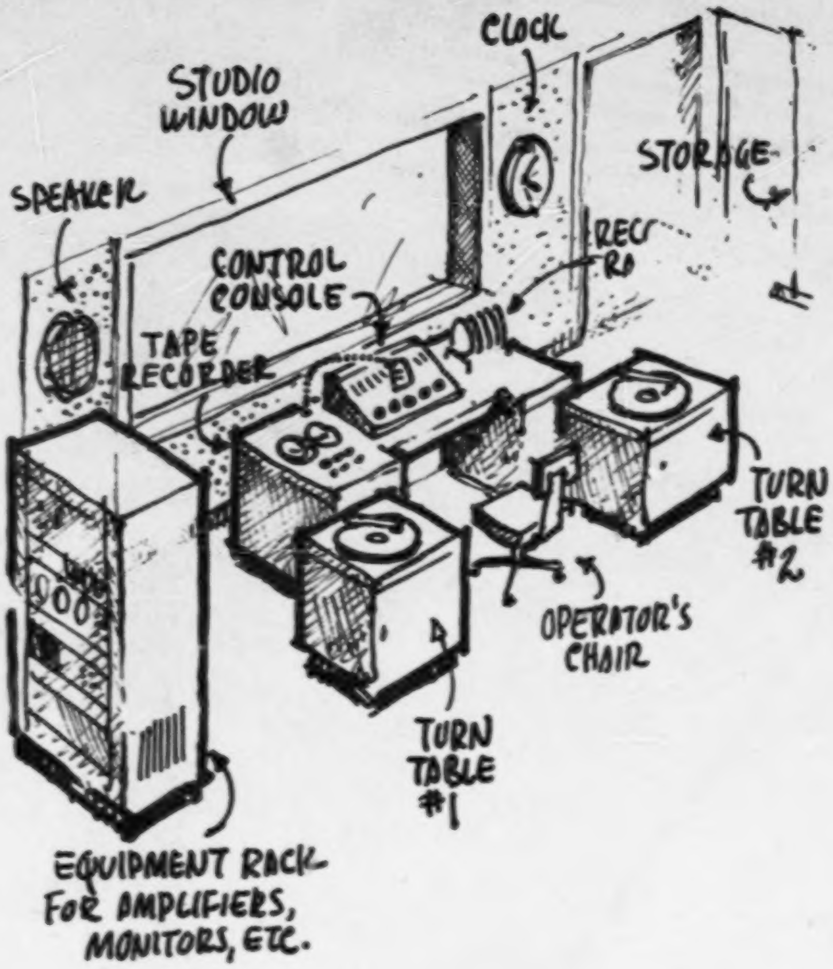
Have a monitor speaker mounted on the wall.

Have wiring conduits accessible for repair or expansion.

If separated from studio by wall, be provided with independent heating and ventilating.

If separated from studio by wall, be provided with wall clock and communication with studio.

Have wiring and power needs planned by a qualified electrical engineer.


CLOCK
STUDIO WINDOW
STORAGE
SPEAKER
REC RA
CONTROL CONSOLE
TAPE RECORDER
TURN TABLE #2
OPERATOR'S CHAIR
TURN TABLE #1
EQUIPMENT RACK FOR AMPLIFIERS, MONITORS, ETC.

THE WORK AND STORAGE AREA

The work and storage area should:

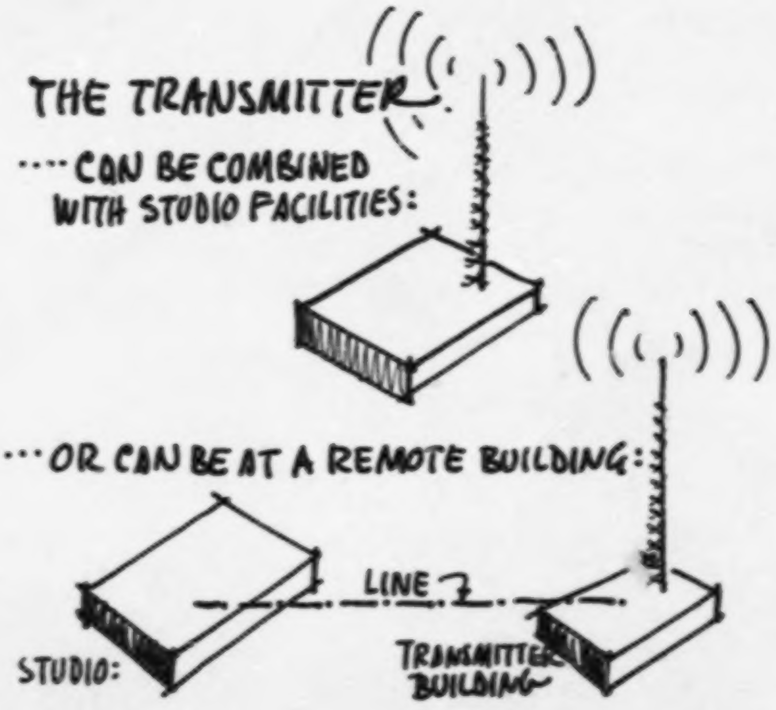
Have space for work bench for making minor equipment repairs.

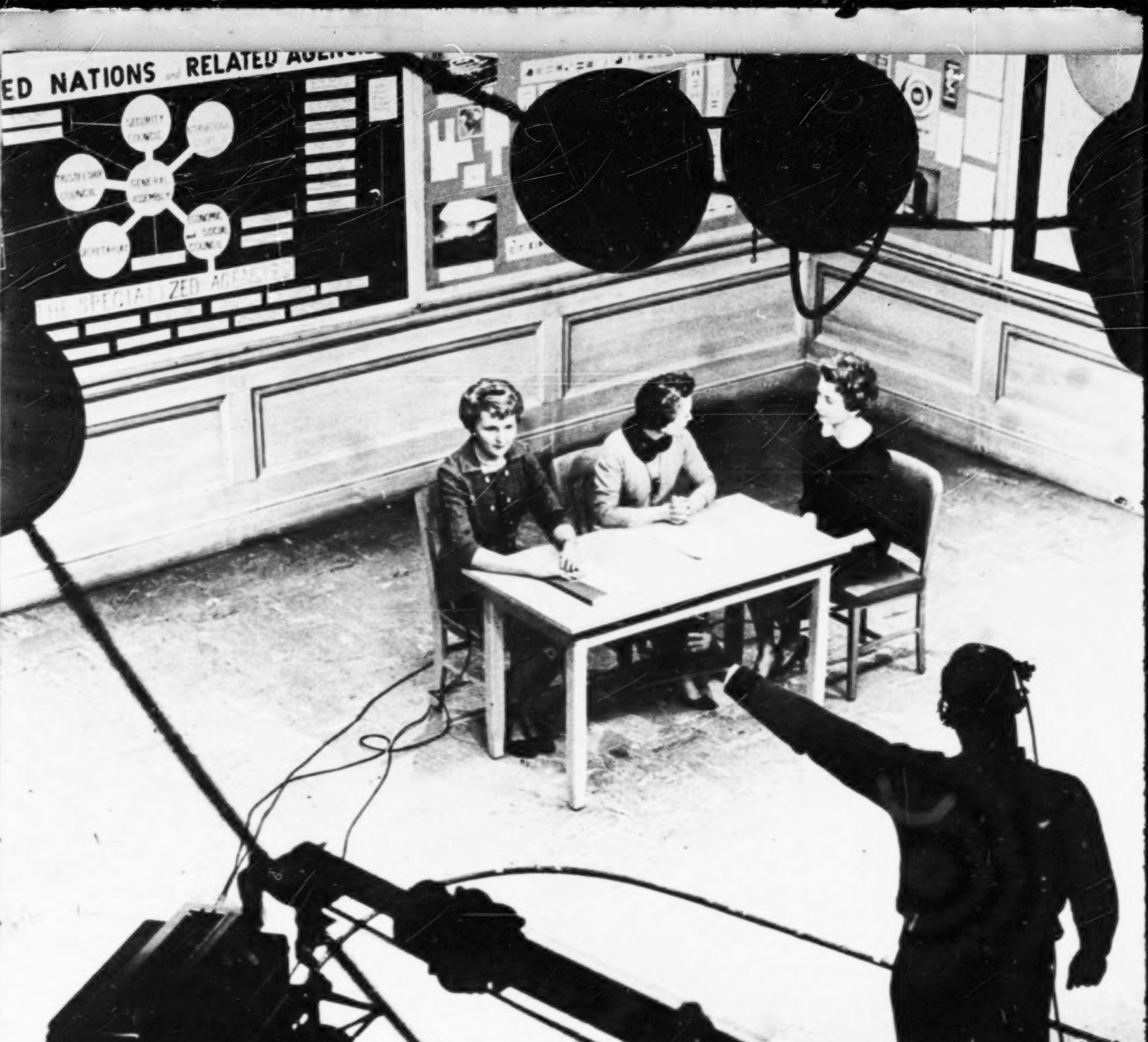
Have storage space for equipment parts.

Have a minimum of three double electrical outlets.

Have adequate ventilation and heat control.

The transmitter and tower for the school radio station should be planned with the technical assistance of an electrical engineer and technicians from corporations producing this kind of equipment. Factors to be considered are cost, appropriateness of power of transmitter to the specific uses to which the school radio station will be put, power of transmitter which may be authorized by the Federal Communications Commission, and desirability of locating the transmitter in the building housing the studio or elsewhere. Care should be taken to insure that the transmitting tower should be located so that the radiated power adequately covers the areas to be served. School personnel and technicians should consider these problems cooperatively.


THE TRANSMITTER
.... CAN BE COMBINED WITH STUDIO FACILITIES:
... OR CAN BE AT A REMOTE BUILDING:
LINE
STUDIO:
TRANSMITTER BUILDING


ED NATIONS and RELATED AGENC
SECURITY COUNCIL
TRUSTEESHIP COUNCIL
GENERAL ASSEMBLY
SECRETARIAT
ECONOMIC and SOCIAL COUNCIL
THE SPECIALIZED AGENCIES

CHICAGO PUBLIC SCHOOLS

TELEVISION FACILITIES

This section of the manual treats with the type of TV facility that serves an entire school system. This is not the only kind of facility that a school district may wish to consider for its instructional requirements. Closed-circuit TV facilities, simpler in space and equipment, may be planned for secondary schools in combination with radio and intercommunications facilities. Although this latter type of installation may seem visionary to educators and school board members, the increasing availability of excellent instructional materials that may be broadcast over radio and TV, combined with technical advantages such as videotape, imply that the time is fast approaching when a school radio-TV-intercommunication facility may become a highly important asset to a secondary school. This type of facility is described under the chapter on the Instructional Materials Center.

In planning a television studio for a school system, the initial and potential extent of programming should first be determined.

Questions to be answered include these:

Is the TV teacher to be used for direct instruction, using the classroom teacher for discussions, testing, supervised study, and personal assistance?

Is TV to be used for lectures and demonstrations, with laboratory work supervised by classroom teachers but coordinated with the TV instruction?

Is TV to be used for "enrichment" in such subjects as art, music, drama, literature?

Is TV to play a major or minor role in the school in any or all of its applications?

Is TV to be available as an instructional aid in all subject areas or is its use to be limited to specific subjects or courses?

Is TV to be used for administration and in-service education?

These questions may be answered with satisfaction only after careful study of the kinds of TV teaching that will serve to attain the educational goals of the school system.

It is not the purpose of this publication to suggest criteria for instructional uses of educational TV, but it is appropriate here to urge delineation of short and long range plans for use of the medium, and translation of these plans into facilities needed and probable costs.

The following suggestions should be regarded as guidelines in the development of a school system TV studio and its related spaces. Not all of the areas described in this chapter are indispensible to the operation of a school TV station. Each facility must be designed for the particular job of televising the school system plans to do.

Among those who have worked intimately with the development of educational television, one observation is encountered more frequently than any other; use of the medium, once established, will grow, and space should be selected and planned with this probability in mind. Following are suggestions for planning a school system television studio and its related spaces.

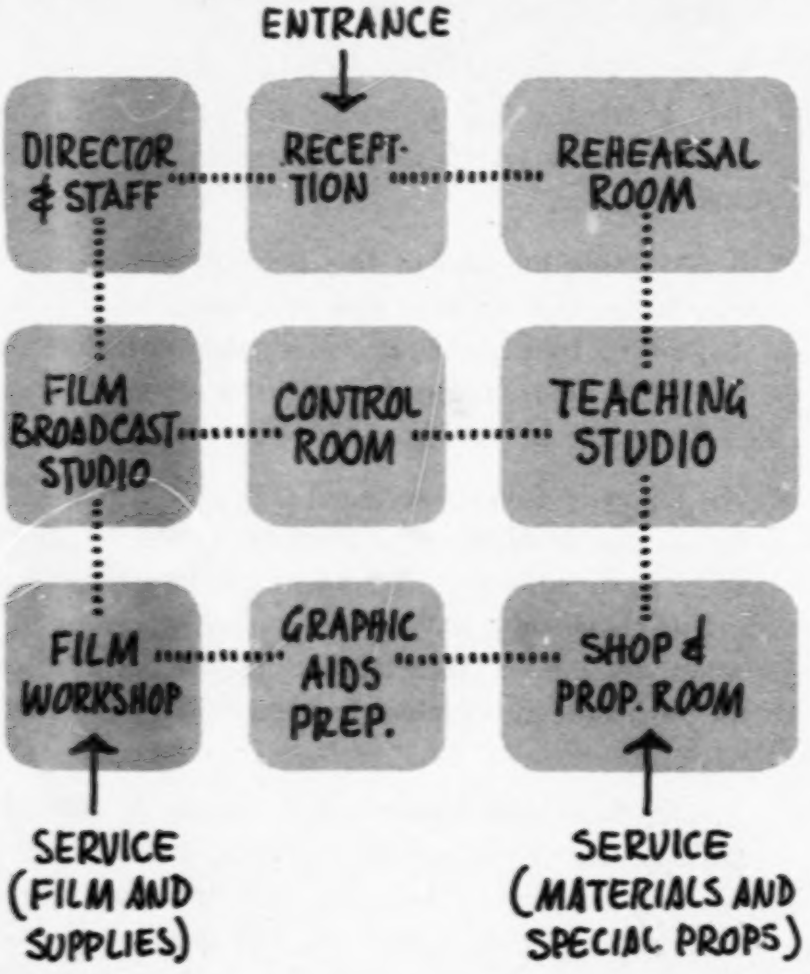
THE TEACHING

The teaching studio is the space in which live programs are televised. It houses the equipment used by the TV teacher, the cameras, and the sets and properties that are to be used or kept in immediate reserve. The teaching studio:

Should be separated from hall and outside noises by another room or a sound lock, (see chapter on Radio Facilities, page 56, for additional suggestions on sound control).

Should provide sufficient space for free and energetic movement of the TV teacher using props, charts, and magnetic chalkboard, as well as space for the proper manning and movement at suitable ranges of TV equipment. Normally a minimum of 1200 sq. ft. will be required and a space 35′x 40′ is very satisfactory. (If future use of video-tape equipment is contemplated, additional space which is sound isolated from studio and control room should be provided. Space requirements may be obtained from the makers of this equipment.)

SPACE RELATIONSHIP DIAGRAM:



May provide space for seating a small group of students (for the TV teacher who prefers to work before a small audience).

Should provide space for two or three sets to permit preparations ahead of time; should have property storage facility nearby.

Should be equipped with a set of wide doors (soundproof) through which props may be moved. These doors should give convenient access to a storage and properties preparation area.

Should, if feasible, be accessible from driveway so that machinery and equipment may be driven into the studio. This would require special bi-parting, weatherstripped doors with low sound transmission.

Should be provided with a wall with large windows separating studio from control room. Windows should be of thermal-pane (or double-glazed) non reflecting glass, set at a slant toward floor.

Should be provided with overhead and supplemental lighting and a lighting switchboard on recommendation of qualified lighting engineer, who should also be consulted regarding the light diffusing and reflecting qualities needed in the studio. Outlets for portable lighting should be located on each wall.

TV STUDIO

Studio should be provided with grid system, equipped with continuous bus ducts for lighting.

Should have wiring that is accessible and installed so that changes and additions may easily be made.

Should have a heating and ventilating system that will insure uniform temperatures under varying conditions. Air must be circulated over equipment racks to break up heat pockets. Heat production and close condition of room require effective controls. Equipment should be noise-free.

Should have floors that are level, quiet, and free from obstructions. Experience has shown concrete floors to be far more satisfactory than wooden floors.

Should have no windows.

Should have a map rail installed of sufficient size and strength to support a number of maps and charts. Height of rail should be approximately 78".

Should be provided portable screen for use with various kinds of projection equipment, including the overhead projector.

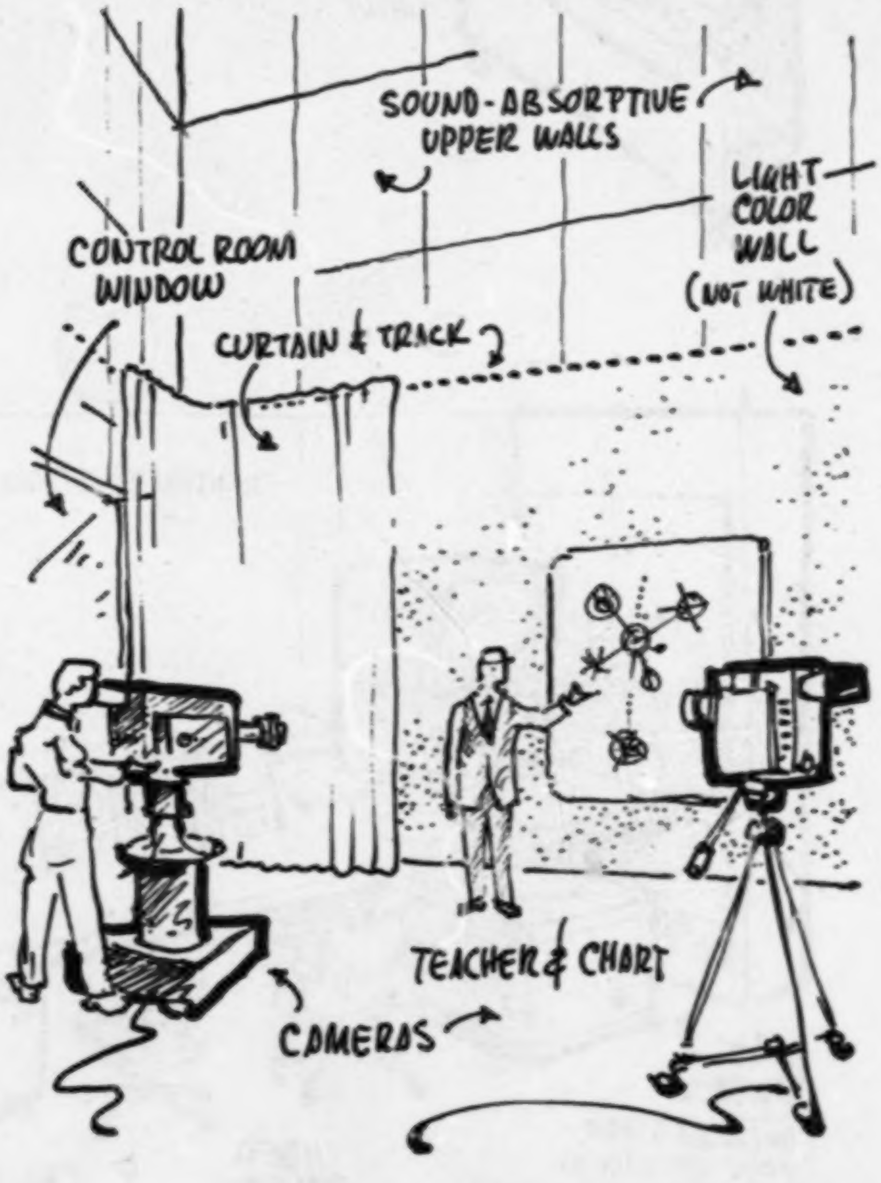
Insofar as possible, equipment such as desks, magnetic chalkboard, and chartstands should be portable to insure flexible use of studio space. Water, gas, air, and electricity should be provided for demonstrations.

Should have sufficient ceiling height to allow for lights and supporting grid. Fourteen feet is recommended but lower ceilings can be used with modified lighting installations.

Should be provided with a floor microphone, desk, and lavolier microphone (of the latter type, wireless units are especially valuable in many instructional situations). Ordinarily two or more TV cameras should be provided of a type appropriate to the quality of programs desired and the budgetary restrictions of the school system. Vidicon cameras have low cost of operation and maintenance, freedom from "sticking" pictures, are easy to handle, and give good picture detail. They are satisfactory for simple programming. Image Orthicon cameras are more expensive, more sensitive, are costly to maintain, and require skilled operators.

Microphone inputs should be provided as indicated by anticipated production requirements.

If only one studio is planned, it should be fitted for flexible, not specialized uses, and should be arranged and equipped for continuous programming.



THE CONTROL ROOM

The control room is used by the program director to control the visual and sound elements of the television broadcast and sometimes to control remotely operated TV cameras. It houses the monitors and control panel which enable the director to switch the picture to the camera most effective at any given moment. In its more advanced form it also houses a monitor and remote control system for previewing and broadcasting material televised in a film studio (see next section), enabling the director to coordinate such materials with live broadcasts from the teaching studio. The control room should:

Be separated from the teaching studio by a wall with a glass panel to permit full viewing of the studio by the director. Separation of the control area is desirable to prevent distraction of the teacher.

Be provided with independent heating and ventilating controls. Proper ventilation and heat control is highly essential in this small room because of the intense heat produced by electronic equipment.

Provide space for housing and manning the monitoring, switching, sound control and camera control equipment, and for housing the power supply and other equipment required for the particular system being installed. Space requirements should be determined in cooperation with equipment suppliers.

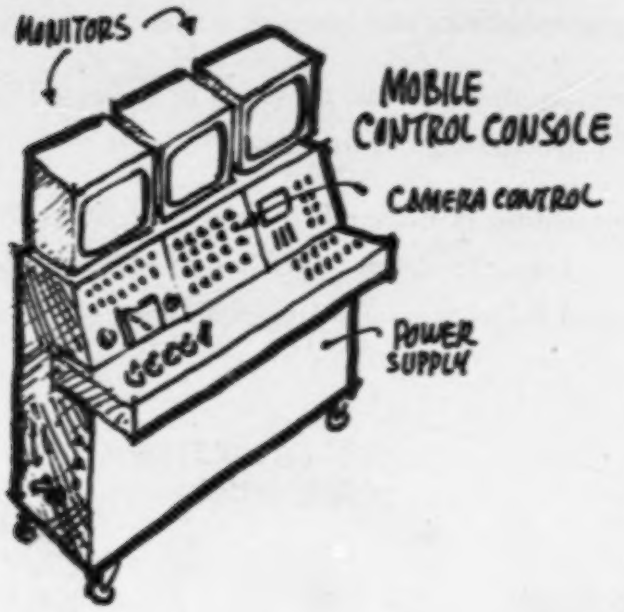
Be connected by a quiet-operating, soundproof door with the teaching studio.

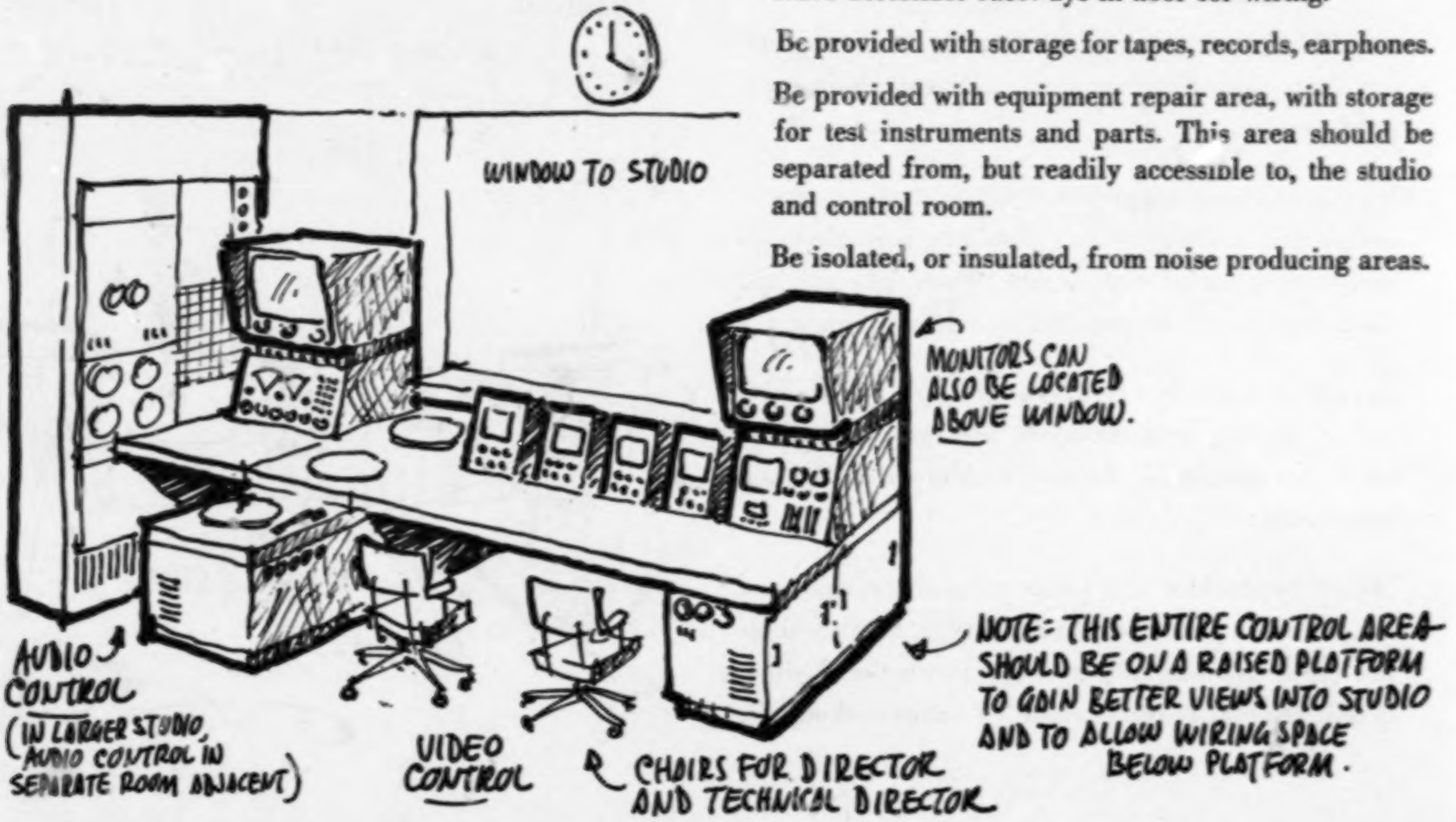
Have accessible raceways in floor for wiring.

Be provided with storage for tapes, records, earphones.

Be provided with equipment repair area, with storage for test instruments and parts. This area should be separated from, but readily accessible to, the studio and control room.

Be isolated, or insulated, from noise producing areas.


MONITORS
MOBILE CONTROL CONSOLE
CAMERA CONTROL
POWER SUPPLY


WINDOW TO STUDIO
MONITORS CAN ALSO BE LOCATED ABOVE WINDOW.
NOTE: THIS ENTIRE CONTROL AREA SHOULD BE ON A RAISED PLATFORM TO GAIN BETTER VIEWS INTO STUDIO AND TO ALLOW WIRING SPACE BELOW PLATFORM.
AUDIO CONTROL (IN LARGER STUDIO, AUDIO CONTROL IN SEPARATE ROOM ADJACENT)
VIDEO CONTROL
CHAIRS FOR DIRECTOR AND TECHNICAL DIRECTOR

FILM BROADCASTING STUDIO

The film broadcast studio is used to supplement live TV broadcasts with kinescopes, motion pictures, opaques, and slides. Opaque and slide material may be integrated with narrative, either live or tape, and broadcast either from the film studio or by remote control from a control room.

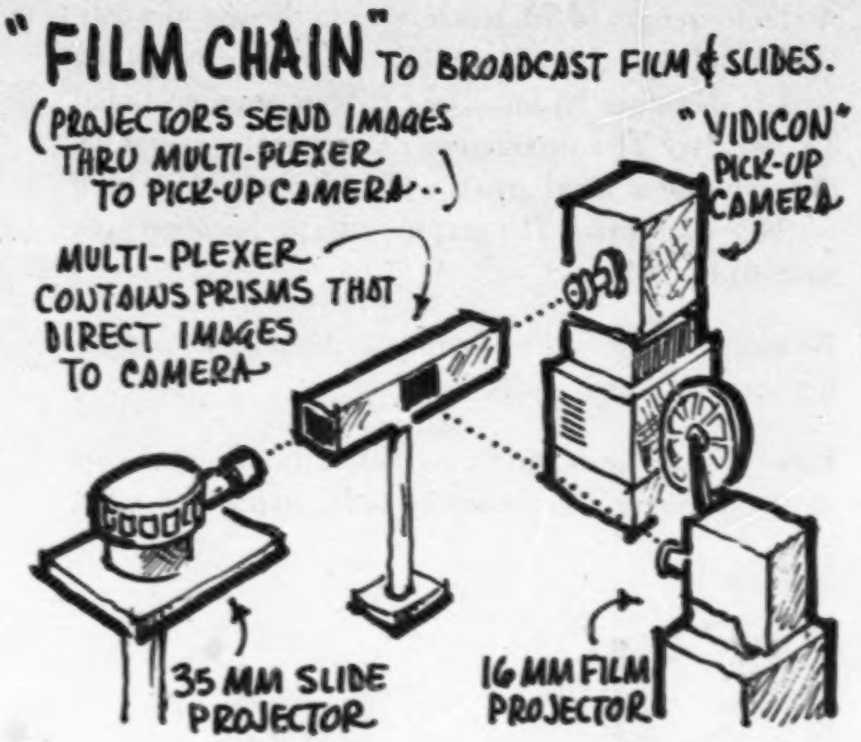
Although the film broadcast studio is currently not employed as widely as live broadcasting in educational TV, it holds great promise for the future as more and more film and kinescope material becomes available for TV teaching. Videotape reproduction is also a function a school district may wish to include, or at least reserve space for, in the film broadcasting studio. The film broadcasting studio should:

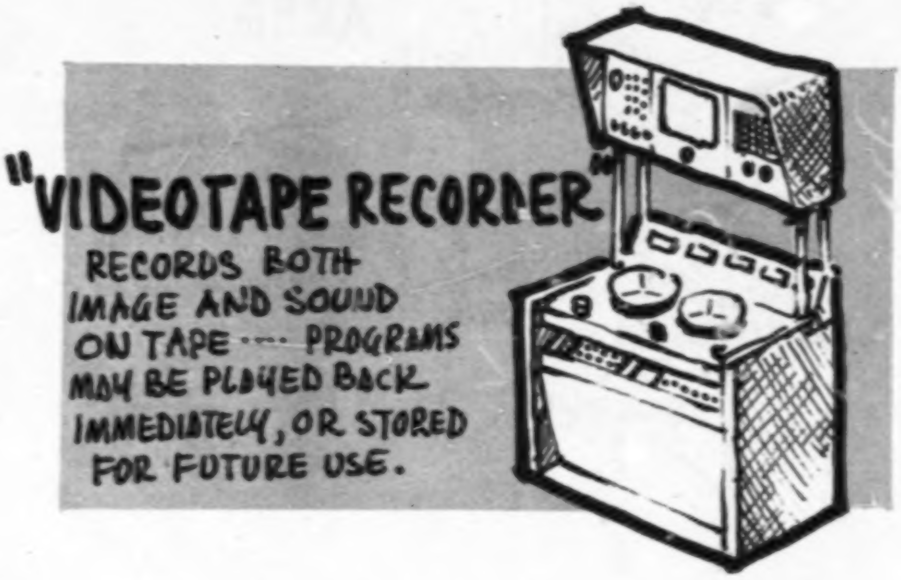
Be provided space for the installation of a film camera, 16 mm film projector, 35 mm slide projector, and a multiplexer. A minimum of 12x15 feet is suggested for this equipment. An additional 16 mm film projector and an opaque projector may be considered where more extensive programming is desired.

Be equipped with storage racks, shelves, and files for motion picture films, filmstrips, slides, charts, photographs, etc. Storage and equipment may, if desired, be provided in separate room between film broadcast studio and film preview room. Provision should be made for future expansion of this space, because the use of films and videotapes is likely to grow rapidly.

Be provided a table with film editing, repairing, and splicing equipment.

Have space for work table adjacent to film storage.


"FILM CHAIN" TO BROADCAST FILM & SLIDES.
(PROJECTORS SEND IMAGES THRU MULTI-PLEXER TO PICK-UP CAMERA..)
"VIDICON" PICK-UP CAMERA
MULTI-PLEXER CONTAINS PRISMS THAT DIRECT IMAGES TO CAMERA
35 MM SLIDE PROJECTOR
16 MM FILM PROJECTOR


"VIDEOTAPE RECORDER"
RECORDS BOTH IMAGE AND SOUND ON TAPE --- PROGRAMS MAY BE PLAYED BACK IMMEDIATELY, OR STORED FOR FUTURE USE.

Be adjacent to a film preview room, and connected with this room by a door. Wall and door between two rooms should be soundproof.

Should be located as near as possible to the teaching studio. Preferably should be located near the graphics shop.

Should be free of obstructions and permanent installations that interfere with free and convenient movement in and out of properties, dollies, and hand trucks.

GRAPHIC AIDS PREPARATION AND SHOP AREA

A chief strength of TV teaching is in the use of excellent visual materials. A graphic materials preparation area is therefore an important part of an educational TV facility. The production of materials should be done by professional artists and craftsmen under good working conditions. The graphic aids preparation area should:

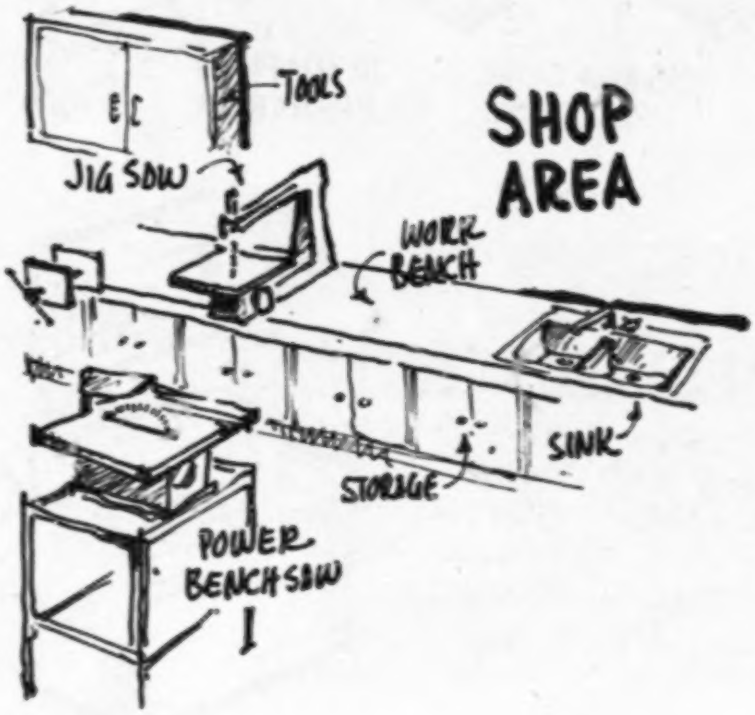
Be located close to the teaching studio and the properties storage room.

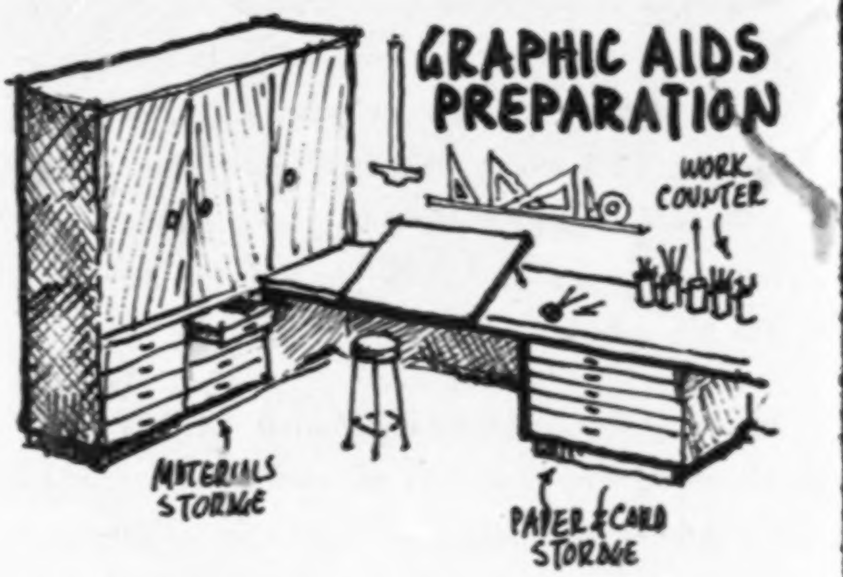
Have storage for a variety of materials including construction paper, cardboard, woods, string and wire, paints, brushes, crayons, transparency materials, glues, paper cutter, scissors, semi-completed graphs, mock-ups and models, hand tools, and construction materials (nails, screws, bolts, clamps, etc.).

Have space for, and be equipped with, double sink, work counter, work benches, vises, jig-saw, multi-purpose power saw.

Have space for draftsman's table and stool.

Have space for a small photographic darkroom including various photo and graphics duplicating processes.

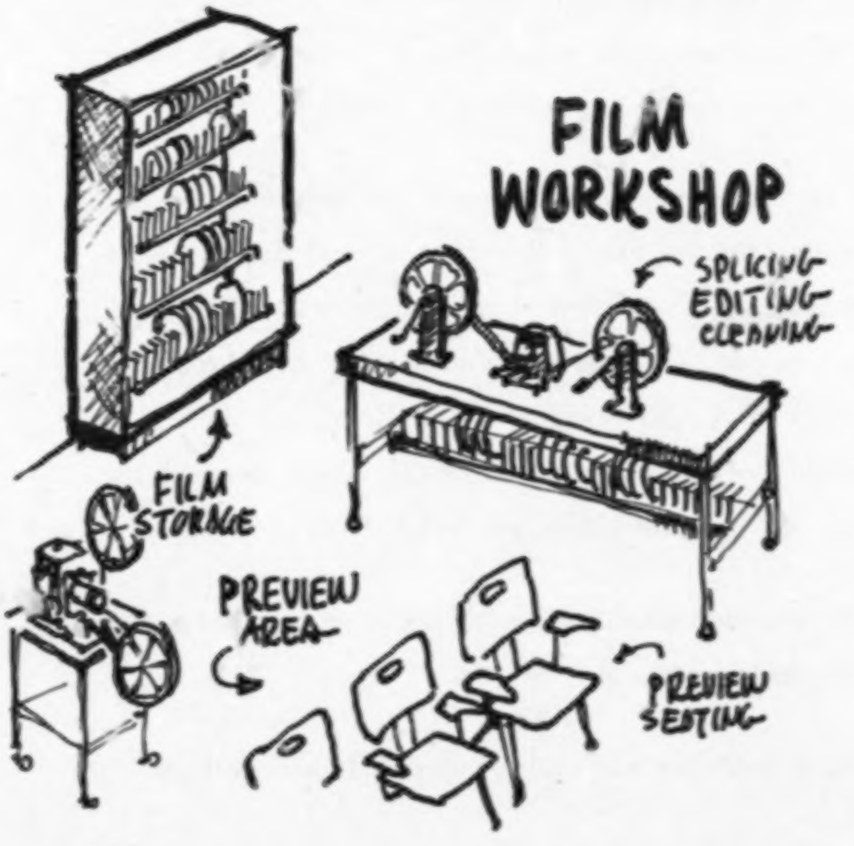

TOOLS
JIG SAW
SHOP AREA
WORK BENCH
SINK
STORAGE
POWER BENCH SAW


GRAPHIC AIDS PREPARATION
WORK COUNTER
MATERIALS STORAGE
PAPER & CARD STORAGE

REHEARSAL ROOM

It is helpful to have, as a part of the teaching studio, an auxiliary room for rehearsals with about the same dimensions as the teaching studio. Such a room is particularly needed if the broadcasting schedule of the studio itself is full, and little rehearsal is possible in the studio itself.

Space and equipment for such a room should, except for TV and lighting equipment, parallel that in the TV studio itself. The room should be designed for ready conversion to a live studio.


FILM WORKSHOP
SPLICING EDITING CLEANING
FILM STORAGE
PREVIEW AREA
PREVIEW SEATING

FILM WORKSHOP

When the television system makes use of a film broadcasting studio, special facilities for previewing, editing, and splicing are required.

In a school system having a centralized film library and facilities for previewing and editing instructional slides and films, the possibilities of combining any or all of these functions with TV film editing and previewing should be explored before constructing new facilities. The following suggestions are offered for planning the TV film workshop.

For the previewing area:

Provide space for storage of 35 mm slide projector, 16 mm motion picture projector, opaque projector, overhead projector, and projection stands.

Provide space for seating 15-20 persons between projector and screen.

Provide for suspension of screen at height so that beam of projectors will clear heads of persons seated in room.

Screen should be appropriate size for room and seating capacity, probably 60"x60".

Provide acoustical treatment for high-fidelity sound and isolation or insulation from noise producing areas.

Provide floor free of obstructions for moving projectors and materials carts.

Provide two double outlets in vicinity of projection area.

Provide lights controllable by dimmers for note-taking.

Provide storage for a limited number of films, filmstrips, slides, and materials for the opaque projector.

For the film storage area:

Have storage space to accommodate films, slides, and kinescopes. In general, storage requirements should be based on long-range plans for the development of film TV broadcasting.

Have storage planned for convenient access to, and easy identification of, all stored materials.

Have a counter for the disbursing of, and accounting for, films.

Have storage located as near to the broadcasting studio room as possible.

Have lights located with reference to shelving to give maximum visibility to storage areas.

Have an area for workbench with film splicing and repairing apparatus, located so as not to interfere with circulation of people in the storage and distribution areas.

PROPERTIES STORAGE

The properties storage area is used to store the properties and sets used in the TV studio. This area should be:

Adequate to accommodate a reserve of sets and properties. Three hundred square feet is suggested as reasonably adequate.

Provided flexible and movable shelves and cabinets.

Provided large double or sliding doors. Doors should be easy to lock in "open" position.

Located as near as possible to the teaching studio.

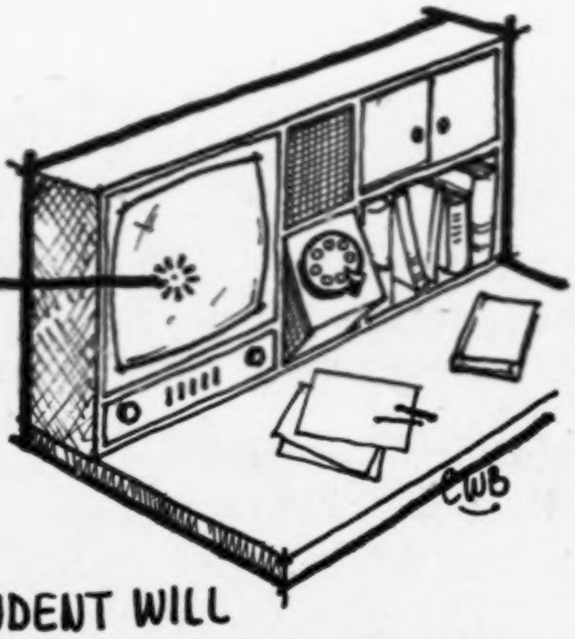
Free of obstructions and installations that interfere with the free and convenient movement of properties, dollies, and hand trucks.

Located near the graphics shop.

LER AREA SENIOR HIGH SCHOOL, BUTLER, PENNSYLVANIA PERKINS & WILL, ARCHITE

TOMORROW

- THE CLASSROOM
- THE LABORATORY
- THE SHOP
- THE HOME
- THE TEACHER'S STUDIO
- THE LARGE GROUP SPACE
- THE SMALL GROUP SPACE
- THE INDIVIDUAL STUDY SPACE

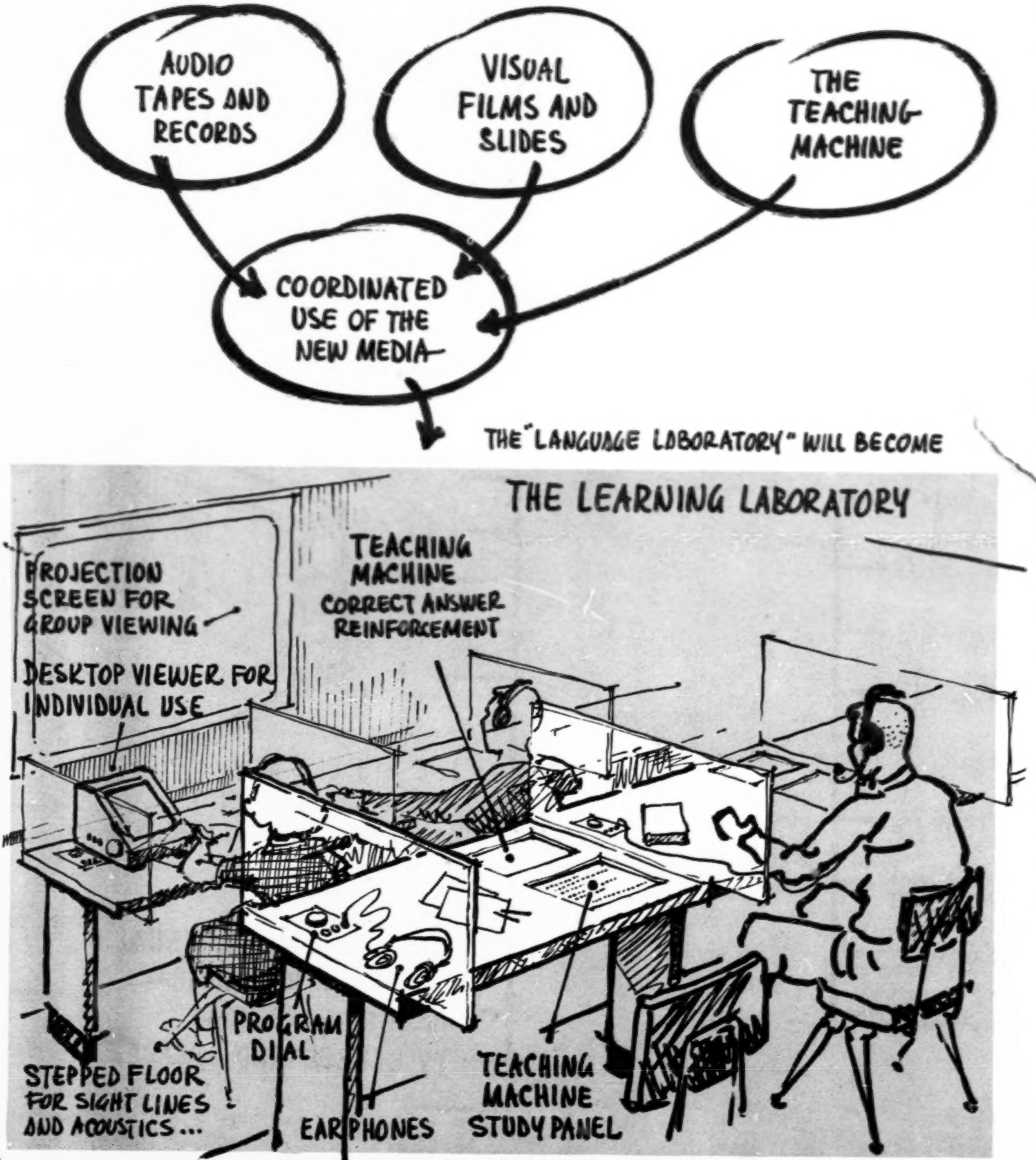


- SLIDES
- FILM ✲
- MICROFILM
- FILMSTRIP
- VIDEOTAPE
- TAPE
- RECORDS
- CARDS
- ETC.

WILL BE STORED AS CARTRIDGES AT A CENTRAL AUTOMATIC IMC

THE STUDENT WILL CONSULT A DIRECTORY, SELECT MATERIAL NEEDED, AND DIAL.

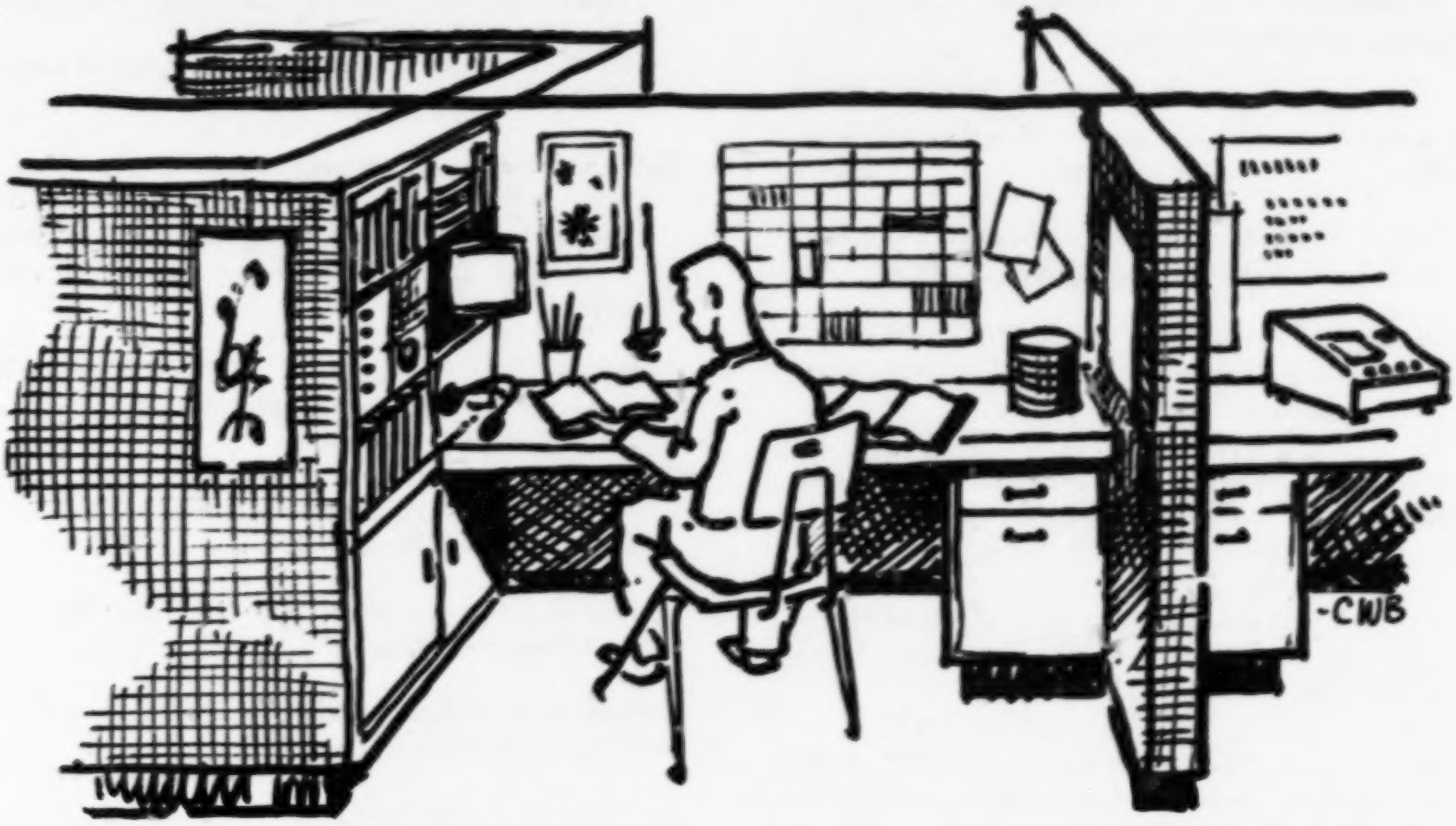
THE AUDIO AND/OR VISUAL MATERIAL WILL APPEAR AND BE HEARD VIA TV SCREEN AND SPEAKER.

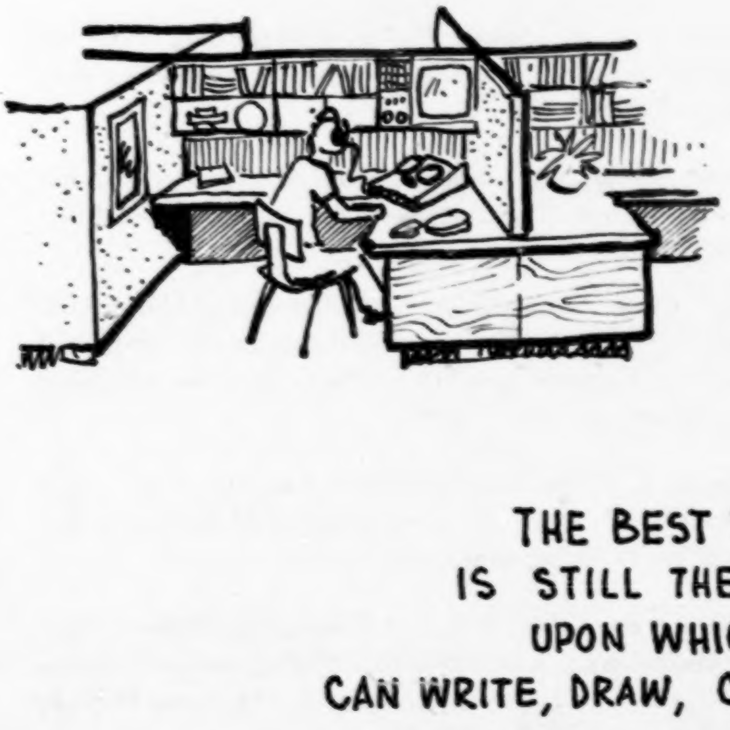

AUDIO TAPES AND RECORDS
VISUAL FILMS AND SLIDES
THE TEACHING MACHINE
COORDINATED USE OF THE NEW MEDIA
THE "LANGUAGE LABORATORY" WILL BECOME
THE LEARNING LABORATORY
PROJECTION SCREEN FOR GROUP VIEWING
TEACHING MACHINE CORRECT ANSWER REINFORCEMENT
DESKTOP VIEWER FOR INDIVIDUAL USE
PROGRAM DIAL
STEPPED FLOOR FOR SIGHT LINES AND ACOUSTICS ...
EARPHONES
TEACHING MACHINE STUDY PANEL

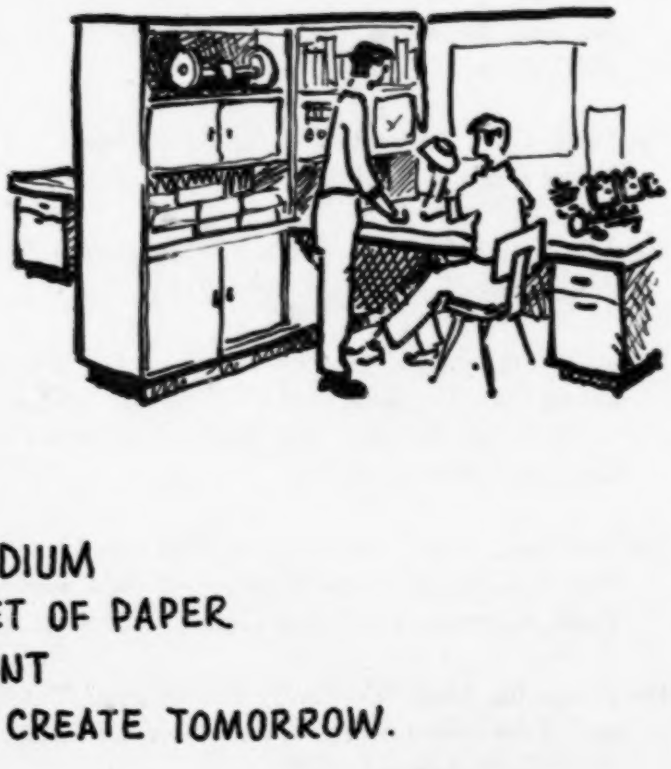
TOMORROW

THE NEW MEDIA-

- CAN MAKE INDIVIDUAL SCHEDULING POSSIBLE...
- CAN MAKE INDIVIDUAL LEARNING POSSIBLE...







THE BEST TEACHING MEDIUM
IS STILL THE BLANK SHEET OF PAPER
UPON WHICH THE STUDENT
CAN WRITE, DRAW, CALCULATE AND CREATE TOMORROW.

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